

**Environmental Assessment  
Wilson's Creek National Battlefield  
Fire Management Plan**



**December 2004**

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# Chapter 1 - Purpose and Need

## 1.1 INTRODUCTION

This Environmental Assessment (EA) documents the results of a study of the potential environmental impacts of an action proposed by the National Park Service to amend the Wilson's Creek National Battlefield Fire Management Plan.

This EA has been prepared in compliance with:

The National Environmental Policy Act (NEPA) of 1969 (42 United States Code (USC) 4321 et seq.), which requires an environmental analysis for major Federal actions having the potential to impact the quality of the human environment;

Council of Environmental Quality Regulations at 40 Code of Federal Regulations (CFR) 1500-1508, which implement the requirements of NEPA;

National Park Service. Conservation Planning, Environmental Impact Analysis, and Decision Making; Director's Order #12 and Handbook.

### *The Purpose of an Environmental Assessment (EA)*

An EA study is performed by a Federal agency, such as the National Park Service, to determine if an action they are proposing to implement would significantly affect any portion of the environment.

The intent is to provide project planners and Federal decision-makers with relevant information on a Preferred Alternative's potential impacts to the environment.

If the study finds no significant impacts, then the agency can publish a Finding of No Significant Impact (FONSI) and can proceed with the action. If the study finds there would be significant impacts, then the agency must prepare and publish a detailed Environmental Impact Statement to help determine how to proceed with the action.

Key objectives of NEPA are to help Federal agency officials make well-informed decisions about agency actions and to provide a role for the general public in the decision-making process. The study and documentation mechanisms associated with NEPA seek to provide decision-makers with sound knowledge of the comparative environmental consequences of the several courses of action available to them. NEPA studies, and the documents recording their results, such as this EA, focus on providing input to the particular decisions faced by the relevant officials. In this case, the Superintendent of Wilson's Creek National Battlefield is faced with a decision to amend the park's Fire Management Plan as described below. This decision will be made within the overall management framework already established in the Wilson's Creek National Battlefield General Management Plan. The alternative courses of action to be considered at this time are, unless otherwise noted, crafted to be consistent with the concepts established in the General Management Plan (copies of the General Management Plan can be obtained from NPS personnel at the park).

In making decisions about National Park Service administered resources, the Park Service is guided by the requirements of the 1916 Organic Act and other laws, such as the Clean Air Act, Clean Water Act, and Endangered Species Act. The authority for the conservation and management of the National Park Service is clearly stated in the Organic Act, which states the

agency's purpose: "...to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." This authority was further clarified in the National Parks and Recreation Act of 1978: "Congress declares that...these areas, though distinct in character, are united...into one national park system.... The authorization of activities shall be construed and the protection, management, and administration of these areas shall be conducted in light of the high public value and integrity of the National Park System and shall not be exercised in derogation of the values and purposes for which these various areas have been established, except as may have been or shall be directly and specifically provided by Congress."

### *Background*

Wilson's Creek National Battlefield was established by law on April 22, 1960. The park consists of 1,752 rolling acres in the southwest portion of Missouri. It is three miles east of the town of Republic, approximately 1/2 mile west of the town of Battlefield, one mile east of the City of Republic, and 10 miles southwest of Springfield. The creek for which the battle was named flows south through the park.

The battlefield is the site of an important battle for control of the state of Missouri during the first year of the Civil War. The Union forces were under the command of Brigadier General Nathaniel Lyon, who was killed in the battle. While the Union lost this particular struggle, they did succeed in keeping the state of Missouri under Union control. This accomplishment strengthened the hand of the Unionists in Kentucky who also kept much of their state loyal in the face of Confederate invasion. Had Missouri and Kentucky seceded, chances for Southern victory during the Civil War would have been greatly enhanced (NPS, 1977a).

The park features a 4.9 mile, one-way auto tour route with interpretive stops at all the major historic points on the battlefield (see map on following page). The visitor center at the beginning of the tour route has interpretive displays, including an animated map depicting the sequence of the battle, a video presentation and a museum. Trails and a picnic area are also available. The park is popular not only as an historic site, but for recreational uses such as hiking, biking, and running by local residents.

### *Enacting Legislation and Legislative History*

The historic importance of the battle at Wilson's Creek was recognized early on. Four months after the battle, on December 24, 1861, a joint resolution was passed by Congress in recognition of Brigadier General Nathaniel Lyon and his troops. This resolution requested that President Lincoln order it to be read "at the head of every regiment in the army of the United States." Only five other battles received such recognition during the Civil War. This resolution became the first piece of legislation to be enacted relating to Wilson's Creek (Hazelwood, n.d.)

The enabling legislation establishing the park, Public Law 86-434, was passed by Congress on April 22, 1960. This law mandated the National Park Service to acquire the lands comprising the battlefield site and any adjacent lands "...necessary or desirable to carry out the purposes of this Act...", and provided appropriations to do so. The law stated that the lands acquired under the Act "...shall be set aside as a public park for the benefit and enjoyment of the people of the

United States.” The law also directed the Park Service to make improvements including roads, trails, markers and buildings and other improvements deemed necessary “...for the care and accommodation of visitors.”

Testimony given before House and Senate subcommittees prior to enactment of PL 86-434 is evidence of local interest in the establishment of the park and understanding of the historic value of the site. Rep. Charles Brown stated that not only had local citizenry been trying to get the site commemorated for 50 to 75 years, but tourists from all over the country visit and search out the battle site. He further emphasized that the importance of Civil War battle sites West of the Mississippi had long been ignored. Sen. Edmundson noted the beauty of the terrain surrounding the battlefield site, and also cited a letter from a former Chief of Army Engineers who stated that “...the Battle of Wilson's Creek rated of higher prestige to the soldiers of the Civil War than the history books currently give it credit for. Men who fought at the Battle of Wilson's Creek were known by others as “Wilson's Creek Men” for having participated in the bloodiest battle West of the Mississippi.” Additional remarks, by Sen. Yarborough, pointed to the need for national parks in the U.S., particularly in the area of Wilson's Creek due to projected population growth.

In 1968 Secretary of the Interior Stewart Udall signed a memorandum stating that the Master plan should be implemented by developing the battlefield tour road and interpretive exhibits, by restoring the historic scene, and providing a visitor center.

The legislative history of the park thus establishes its importance as an historic site, the natural beauty of the area, the importance of restoring the historic scene, and the need for adequate interpretation to support the purpose established by the enacting legislation of making the site available for the enjoyment and benefit of the public.

National Park Service guidance stresses that the Park Service must not only comply with NEPA and the individuals unit's enabling legislation, but is also required under the Service's own Organic Act to pass resources on to future generations “unimpaired” (DOI, 2001). This EA or values that are (1) necessary to fulfill specific purposes identified in the enabling legislation of the park, (2) key to the natural or cultural integrity of the park or opportunities for enjoyment of the park, and (3) identified as a goal in the park's general management plan or other Park Service planning documents (see *Chapter 3 – Environmental Consequences*).

## 1.2 PURPOSE AND NEED

### *Purpose for Action*

The Fire Management Plan (FMP) is a revision to Wilson's Creek National Battlefield's Fire Management Plan that was written in 1986. The revised FMP outlines a detailed program of actions to be taken by Wilson's Creek National Battlefield to meet the fire management goals for the area.

The plan is guided by Director's Order-18 (DO-18) which requires that all park units with vegetation capable of sustaining fire develop a FMP. The plan is also guided by Wilson's Creek General Management Plan (GMP) (NPS, 2003). Major goals of the GMP are public safety,

natural and cultural resource preservation, and rehabilitation of the cultural landscape. The Draft FMP provides an implementation strategy to achieve these goals by proposing the following. Suppress all wildfires while providing for the safety of employees, visitors, and park neighbors. Protect from un-wanted fire National Register properties comprising 1750 acres, 27 structures on the List of Classified Structures, over 50 archeological sites, features of the cultural landscape, and other park assets. Protect threatened and endangered species (i.e. gray bats and Missouri bladderpod) by avoiding or mitigating significantly adverse impacts from wildland fire, prescribed fire, and suppression activities. When using prescribed fire and fuel management projects provide for the safety of employees, visitors, and park neighbors and use the best available scientific information and technology to support, monitor, and adaptively manage for the benefit of natural resources and the cultural landscape. Use prescribed fire and fuel management projects to increase the distribution and abundance of the Missouri Bladderpod, manage natural resources, rehabilitate and interpret the historic cultural landscape, maintain the ecological integrity of habitat and improve glade habitats, and reduce exotic species. Increase public awareness of the role of fire in natural processes and the use of fire as a management tool to restore natural habitat and rehabilitate the cultural landscape

#### *Need for Action*

In pre-settlement times the battlefield's vegetation appears to have been a mosaic of savanna, small prairie openings, glades, and riparian forest. Savanna apparently dominated the battlefield's uplands. By 1850 a handful of families had settled within the boundaries of the current park. At the beginning of the Civil War, farms, numerous buildings, roads, and fields dotted the landscape. The 1861 landscape of Wilson's Creek would have reflected this agrarian presence, overlaid upon the still dominant pre-settlement savanna (NPS 1991).

Fire is a natural component of prairies and savannas; additionally, it has been used by humans since prehistoric times for vegetation and game management. In the past, large fires usually occurred during drought periods that followed 1-5 years of above-average precipitation which provided abundant and continuous fuel. Fire frequency probably varied from 5-10 years in level-to-rolling topography, and from 15-30 years in the rougher, dissected topography (NPS, 1986).

Guyette (1982) predicted a fire frequency of 3.2 years (1730 to 1870) on an Ozark glade in southwestern Missouri (near Ava, MO); after 1870 it dropped to 22 years. Wilson's Creek is further west, where the frequency was likely shorter.

Guyette (1991) also predicted a fire frequency of 4.3 years (1710 to 1810) on a post oak savanna near the research site near Ava. Guyette points out that this may be a "conservative estimate because low-intensity fires may not have scarred any of the sample trees and thus would be undetected." After 1810 the fire free interval climbed to 6.4 years. Guyette states that "An increase in oak stems of sapling size may have resulted from the low fire frequency between 1810 and 1850." This correlates with eye witness accounts of the battle and a sketch of "Bloody Hill" that documents an abundance of oak saplings up to 20-25 feet tall with some larger savanna trees present.



Many managers are arriving at a 3-5 year fire return interval for post oak savannas and glades in southwest Missouri. The ecologist contracted for the Wilson's Creek Cultural Landscape Report is recommending annual fall burning.

With fire suppression the norm for federal agencies until recent years, many areas of the park that were savanna have become overgrown with shrubs, trees, and brush. Former vistas are obstructed, making it difficult in some instances for visitors to visualize and understand tactics, troop movements, and the historic appearance of battlefields and surrounding areas. While a complete return to a natural fire regime is impossible due to the small size of the park and proximity to nearby towns and urban areas, fire is an important tool in helping to restore historic vistas. Providing a more historically accurate view of the vegetation that would have been found at the time of the battle is extremely important.

At Wilson's Creek, management of natural resources and the cultural landscape go hand in hand. Past fire suppression has depressed habitat; some species formerly found on the site have vanished. Return to a landscape that more closely approximates the historic vegetation will enhance native diversity and may aid in restoring some species no longer found in the park. Judicious use of fire may also aid in the recovery of Threatened and Endangered species.

Wilson's Creek is presently operating under a fire management plan written in 1986. The plan calls for the use of prescribed fire to restore and maintain the savanna and prairie historic scene, no prescribed burning in the forest/brush environment nor in the historic farm field or orchard, and suppression of all wildland fire (NPS, 1987). Writing a new fire management plan will allow the park to consider the extent to which the old plan meets current needs, consider new directions and initiatives, receive public input on fire management, and meet new NPS guidelines.

National Park Service Wildland Fire Management Guidelines (NPS-18) states that "all parks with vegetation that can sustain fire must have a fire management plan." The purpose of this federal action is to develop a fire management plan and program that makes use of fire to enhance the park's cultural landscape and natural resources, while protecting public safety, adjacent property, and park resources.

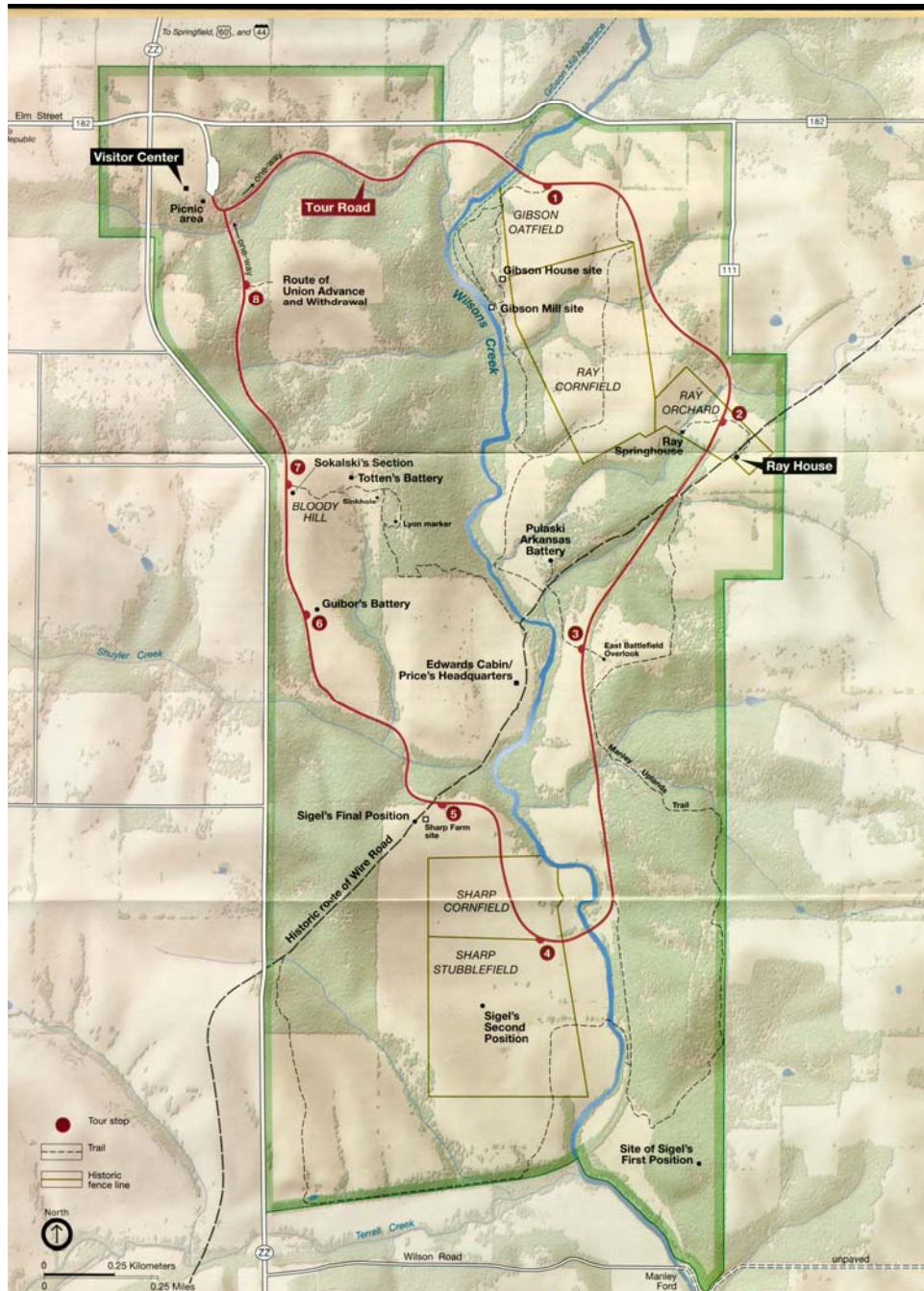
### 1.3 FIRE MANAGEMENT OBJECTIVES

National Park Service Wildland Fire Management Guidelines (NPS-18) requires that all parks with vegetation capable of sustaining fire develop a wildland fire management plan that will meet the specific resource management objectives for that park and to ensure that firefighter and public safety are not compromised. This guideline identifies fire as the most aggressive natural resource management tool employed by the National Park Service. The guideline further states that all non-structure fires are classified as either wildland fires or prescribed fires. Prescribed fires are ignited by management actions to meet specific resource management objectives, and may be authorized by an approved wildland fire management plan. Wildland fires are unplanned, naturally ignited wildland fires. The term wildland fires encompasses fires previously called both wildfires and prescribed natural fires.

DO-18 identifies three paramount considerations for each Park's fire management program. They are:

- protect human life and property both within and adjacent to Park areas;
- perpetuate, restore, replace, or replicate natural processes to the greatest extent practicable; and
- protect natural and cultural resources and intrinsic values from unacceptable impacts attributable to fire and fire management activities

Fig. 1-1 Map, Wilson's Creek National Battlefield



The overall goals of the Wilson's Creek Fire Management Plan are the following:

#### Goals

- Provide for the safety of fire suppression staff, park employees, visitors, and park neighbors.
- Protect the visiting public from all wildland and prescribed fire activities while continuing to provide a quality visitor experience.
- Protect National Register properties (i.e. 1750 acres), structures on the List of Classified Structures (i.e. 27), features of the cultural landscape, and park assets from unwanted fire.
- Protect threatened and endangered species (i.e. gray bats and Missouri bladderpod), by avoiding or mitigating significantly adverse impacts, from wildland fire, prescribed fire, and suppression activities.
- Use prescribed fire and fuel management projects to increase the distribution and abundance of Missouri bladderpod.
- Use prescribed fire and fuel management projects to manage natural resources in support of the rehabilitation of and interpretation of the historic cultural landscape.
- When using prescribed fire and fuel management projects use the best available scientific information and technology to support, monitor, and adaptively manage for the benefit of natural resources and the cultural landscape.
- Use prescribed fire and fuel management projects to maintain the ecological integrity of habitat and improve glade habitat in resource preservation zones.
- Use prescribed fire and fuel management projects to reduce exotic species distribution and abundance; and mitigate significant increases in exotic species due to wildland fire, prescribed fire, and suppression activities.
- Increase public awareness of the role of fire in natural processes and the use of fire in the restoration of natural habitat and rehabilitation of the cultural landscape through interpretive programs during the prescribed fire season.

Measurable and strategic objectives for each Management Zone identified in the GMP are based on the overall fire management goals for the Battlefield (see III.A.)

#### **Landscape Enhancement Zone (720 acres)**

##### **Measurable Objectives:**

- Provide for the safety of fire suppression staff, park employees, visitors and park neighbors.
- Contain 95% of all wildland fires to less than 10 acres.
- Conduct prescribed ignited fires with 98% contained within the prescribed unit and 98% of escapes to less than 50 acres.
- Plan the events with no accidents occurring during suppression, management ignited fires, and fuel management activities; one or less per year.
- Issue press releases and neighbor notifications one week before management ignited fires and fuel management projects. All press releases, notifications, media and visitor contacts should include information on safety and the projects role in glade management

(i.e. threatened species management), and rehabilitating and preserving the cultural landscape of the battlefield.

- Reduce eastern red cedar canopy cover by 80% on one glade (south Wire Road glade) within 5 years.
- Reduce eastern red cedar canopy cover by 80% within 2 meters of historic trees identified in the historic trees map. (Release the stem and canopy of historic trees identified in the historic trees map.)
- Limit fire caused mortality to no more than a 3% historic trees identified in the historic trees map.

Specific objectives for re-established warm season grass habitat with woody plant invasion (see Appendix I) follow.

- Reduce the foliar cover of shrub species from 60% in 2003 to 30% by 2008.
- Maintain native species richness to within 10% of the level in 2003 (80)
- Increase the foliar cover of warm season grasses from 15% in 2003 to 20% by 2008.
- Reduce foliar cover of *Sericea lespedeza* from 18% in 2003 to 15% by 2008.

### **Resource Preservation Zone (150 acres)**

#### **Measurable Objectives:**

- Provide for the safety of fire suppression staff, park employees, visitors, and park neighbors.
- Contain 95% of all wildland fires to less than 10 acres.
- Conduct prescribed fires with 98% contained within the prescribed unit and 98% of escapes to less than 50 acres.
- Plan the events with no accidents occurring during suppression, management ignited fires, and fuel management activities; one or less per year.
- Issue press releases and neighbor notifications one week before management ignited fires and fuel management projects. All press releases, notifications, media and visitor contacts should include information on safety and the projects role in glade management (i.e. threatened species management), and rehabilitating and preserving the cultural landscape of the battlefield.
- Reduce eastern red cedar canopy cover by 80% within 2 meters of historic trees identified in the historic trees map. (Release the stem and canopy of historic trees identified in the historic trees map.)
- Limit fire mortality to no more than a 3% of historic trees identified in the historic trees map.

Specific objectives for glade habitats (see Appendix I) follow.

- Reduce woody shrub foliar cover from 38% in 2003 to 33% in 2008.
- Reduce canopy cover of woody trees from 75% in 2003 to 65% in 2008.
- Maintain native species richness to within 10% of the level in 2003 (120)
- By 2008 reduce foliar cover of annual bromes by 10%.
- By 2008 reduce foliar cover of *Sericea lespedeza* by 75%.
- By 2008 maintain oak recruitment within 10% of the 2003 level.

- Maintain populations of Missouri Bladderpod on 5 glades.

Specific objectives for Manley woodland (see Appendix I) follow.

- Increase native species richness from 105 species in 2003 to 115 species in 2008.
- Reduce the seedling recruitment of Eastern Red Cedar from 150 seedlings/400 square meters in 2003 to 50 seedlings in 2008.
- Increase oak (red and white oaks) recruitment from 100 seedlings/400 square meters in 2003 to 125 seedlings in 2008.

Specific objectives for limestone benches will require additional fire monitoring.

- Reduce the canopy cover of eastern red cedar over 1 meter in height 40%.

Specific objectives for woodland habitats will require additional fire monitoring.

- Reduce canopy coverage of trees by mechanical methods 5%.
- Maintain oak (red and white oaks) seedling recruitment.

### **Landscape Maintenance Zone (540 acres) and Development Zone**

#### **Measurable Objectives:**

- Provide for the safety of fire suppression staff, park employees, visitors, and park neighbors.
- Contain 95% of all wildfires to less than 10 acres.
- Conduct management ignited fires with 98% contained within the prescribed unit and 98% of escapes to less than 50 acres.
- Plan the events with no accidents occurring during suppression, management ignited fires, and fuel management activities; one or less per year.
- Issue press releases and neighbor notifications one week before management ignited fires and fuel management projects. All press releases, notifications, media and visitor contacts should include information on safety and the projects role in glade management (i.e. threatened species management), and rehabilitating and preserving the cultural landscape of the battlefield.
- Reduce eastern red cedar canopy cover by 80% within 2 meters of historic trees identified in the historic trees map. (Release the stem and canopy of historic trees identified in the historic trees map.)
- Prescribe burns cause no more than a 3% loss of historic trees identified in the historic trees map.
- Specific objectives for limestone benches will require additional fire monitoring.
- Reduce the canopy cover of eastern red cedar over 1 meter in height 40%.
- Specific objectives for woodland habitats will require additional fire monitoring.
- Reduce canopy coverage of trees by mechanical methods 5%.
- Maintain oak (red and white oaks) seedling recruitment.

## 1.4 SCOPING ISSUES AND IMPACT TOPICS

### 1.4.1 *Internal Scoping Issues*

The park's internal scoping process suggested that the current (1986) FMP is functioning well and that major changes in fire management policies are not called for. Managers see the plan as having been instrumental in keeping fields in an open condition. The plan, however, is conservative in its limitations on use of prescribed fire, prohibiting it in forest/brush environments or in historic fields or orchards. Now that a successful program of prescribed burning has been established, park managers would like added flexibility, particularly the ability to burn in forest/brush areas, and to a lesser degree in historic fields and orchards. Proposed changes to the current plan are thus viewed as adding flexibility to an already well-functioning program. During internal scoping the following fire management issues were identified:

- Public safety and property protection must be central to all fire management activities, especially given the rapid growth of nearby communities and the proximity of park boundaries to new developments. Public notification regarding prescribed burns and education about management use of fire are essential.
- The park is a cultural landscape with natural elements. Fire management activities need to support both the cultural and natural landscapes.
- Flexibility in prescribed burn schedules is important, in particular to support the federally endangered Missouri bladderpod. Due to the life cycle of this plant, the greatest benefits are generally derived from late summer burns; however, in rare circumstances spring fires are preferable.
- Flexibility to use prescribed fire in different habitats is desirable, in order to continue and expand the park's work in restoring the cultural and natural landscape.

### 1.4.2 *External Scoping Issues*

On February 22, 2002 a scoping notice describing the Proposed Action and inviting the public and agencies to comment was sent out. Three responses were received from agencies (see Appendix E). The Missouri Department of Transportation indicated no issues with the plan. The Greene County Commission indicated no specific issues, other than coordination with local fire protection and other county and state agencies and landowners, which it noted the park was doing. The State Historic Preservation Office stated that their primary concern would be considerations such as where fire lines were placed and methods of protecting historic architecture during prescribed fires or wildland fire suppression.

### 1.4.3 *Impact Topics Included in this EA*

Impact topics are derived from issues raised during internal and external scoping, and from NPS guidelines concerning topics that should be taken under consideration when conducting NEPA analysis (DOI, 1999). Not every conceivable impact of a Proposed Action is substantive enough to warrant analysis. The following topics, however, do merit consideration in this EA:

**Geology and Soils:** Soils can potentially be adversely affected by intense fires as well as by suppression activities. Therefore, impacts to soils and geology are analyzed in this EA.

**Water Resources:** NPS policies require protection of water resources consistent with the Federal Clean Water Act. Both fires and fire suppression efforts can affect water resources by exposing soils, which leads to erosion during storm events and subsequent suspended solids and turbidity in downstream surface waters. Therefore, impacts to water resources are analyzed in this EA.

**Floodplains and Wetlands:** Presidential Executive Orders mandate floodplain management and protection of wetlands. The park contains a creek that is subject to flooding, but does not contain significant wetlands. Therefore wetlands are not analyzed in this EA, but possible impacts to floodplains are considered.

**Vegetation:** The long-term goal of the Park's natural resource management program is to return vegetation to something approximating what was there at the time of the battle. Management of vegetation through the use of fire is an important part of management goals. Therefore, consideration of impact on vegetation is essential to this EA.

**Wildlife:** There are resident populations of various species of reptiles, amphibians, birds, mammals, and invertebrates at Wilson's Creek. Fire has the potential to impact wildlife species either directly or through effects to habitat. Therefore, impacts of the FMP alternatives on wildlife are evaluated in this EA.

**Threatened and Endangered Species:** The Federal Endangered Species Act prohibits harm to any species of fauna or flora listed by the U. S. Fish and Wildlife Service (USFWS) as being either threatened or endangered. Such harm includes not only direct injury or mortality, but also disrupting the habitat on which these species depend. There are three known threatened or endangered species (gray bat, Missouri Bladderpod, and Bald Eagle) that reside on Wilson's Creek National Battlefield or in the case of the Bald Eagle migrate through the park. Therefore, impacts to this resource are considered in the EA.

**Prime and Unique Agricultural Lands:** The Farmland Protection Act requires federal agencies to identify prime and unique farmland, and to consider adverse effects of their actions on these lands. Prime farmland has the best combination of physical and chemical characteristics for producing food, forage, fiber, and oilseed crops. Unique land is land other than prime farmland that is used for production of specific high-value food and fiber crops. Both categories require that the land is available for farming uses. Several prime farmland soils and soils of statewide importance have been identified at Wilson's Creek. Therefore, this impact topic is considered in this EA.

**Air Quality:** The Federal 1963 Clean Air Act stipulates that Federal agencies have an affirmative responsibility to protect a park's air quality from adverse air pollution impacts. All types of fires generate smoke and particulate matter, which can impact air quality within the park and surrounding region to some extent. All of these considerations warrant the inclusion of impacts to air quality in this analysis.



**Visitor Use and Experience:** The 1916 NPS Organic Act directs the Service to provide for public enjoyment of the scenery, wildlife and natural and historic resources of national parks “in such a manner and by such means as will leave them unimpaired for the enjoyment of future generations.” Fire management activities can result in the temporary closure of certain areas and/or result in visual impacts that may affect the visitor use and experience of the park. Therefore, the potential impacts of the proposed FMP on visitor use and experience are addressed in this EA.

**Human Health and Safety:** Fires can be extremely hazardous, even life-threatening, to humans, and current federal fire management policies emphasize that firefighter and public safety is the first priority. All FMP's must reflect this commitment (NIFC, 1998). Therefore, impacts to human health and safety are addressed in this EA.

**Cultural Resources:** Section 106 of the National Historic Preservation Act of 1966 provides the framework for Federal review and protection of cultural resources, and ensures that they are considered during Federal project planning and execution. Wilson's Creek National Battlefield contains historic structures, foundations and cultural remnants, as well as a museum and large Civil War library housed at the Visitors Center. These resources can potentially be impacted by fire, and are therefore considered in this EA.

**Park Operations:** Severe fires can potentially affect operations at national parks, especially in more developed sites like visitor centers, picnic areas, administrative and maintenance facilities. These impacts can occur directly from the threat to facilities of an approaching fire, and more indirectly from smoke and the diversion of personnel to firefighting. Fires have caused closures of facilities in parks around the country. Thus, the potential effects of the FMP alternatives on park operations will be considered in this EA.

#### *1.4.4 Impact Topics Considered but dropped from Further Analysis*

NEPA and the CEQ Regulations direct agencies to “avoid useless bulk...and concentrate effort and attention on important issues” (40 CFR 1502.15). Certain impact topics that are sometimes addressed in NEPA documents on other kinds of Proposed Actions or projects have been judged to not be substantively affected by any of the FMP alternatives considered in this EA. These topics are listed and briefly described below, and the rationale provided for considering them, but they are dropped from further analysis.

**Noise:** Noise is defined as unwanted sound. Fuels reduction, prescribed burns and fire suppression efforts can potentially involve the use of noise-generating mechanical tools and devices with engines, such as chain saws, trucks, helicopters, and airplanes. Each of these devices, in particular helicopters and chain saws at close range, are quite loud (in excess of 100 decibels). However, the use of heavy machinery for extended periods of time is extremely unlikely at Wilson's Creek, given the relatively small size of the park and of units to be burned. Any noise generated by fire management activities would not be of a frequency or intensity to substantially interfere with human activities in the area or with wildlife behavior. Therefore, this impact topic is eliminated from further analysis in this EA.

**Waste Management:** None of the FMP alternatives would generate noteworthy quantities of either hazardous or solid wastes that need to be disposed of in hazardous waste or general sanitary landfills. Therefore this impact topic is dropped from additional consideration.

**Transportation:** None of the FMP alternatives would substantively affect road, railroad, water-based, or aerial transportation in and around the park. One exception to this general rule would be the temporary closure of nearby roads during fire suppression activities or from heavy smoke emanating from wildland fires or prescribed burns. Over the long term, such closures would be very infrequent and would not significantly impinge on local transportation. Therefore, this topic is dismissed from any further analysis.

**Land Use:** The park itself consists of fields, woods, and savannas, historic structures and landscapes, and visitor and administrative facilities. The nearby area outside of park boundaries is rural, with rapid residential growth from two nearby small towns. Fire management activities will support land uses within the park, and will not affect uses outside of park boundaries. Therefore, this impact topic is not included for further analysis in this EA.

**Environmental Justice / Protection of Children:** Presidential Executive Order 12898 requires Federal agencies to identify and address disproportionate impacts of their programs, policies and activities on minority and low-income populations. Executive Order 13045 requires Federal actions and policies to identify and address disproportionately adverse risks to the health and safety of children. None of the alternatives would have disproportionate health or environmental effects on minorities or low-income populations as defined in the Environmental Protection Agency's Environmental Justice Guidance, nor on children, therefore, these topics are not further addressed in this EA.

**Socioeconomics:** NEPA requires an analysis of impacts to the "human environment" which includes economic, social and demographic elements in the affected area. Fire management activities are not expected to impact the overall population, income and employment base of the nearby communities of Republic, Battlefield, and Springfield

**Ecologically Critical Areas:** The Council on Environmental Quality regulations require consideration of the severity of impact on unique characteristics of the geographic area such as proximity to ecologically critical areas (e.g. biosphere reserve, world heritage site, wild & scenic rivers). No ecologically critical areas have been identified within or adjacent to Wilson's Creek National Battlefield, and this impact topic has been dismissed from further evaluation.

**Wilderness:** According to National Park Service Management Policies (2001), proposals having the potential to impact wilderness resources must be evaluated in accordance with National Park Service procedures for implementing the National Environmental Policy Act. Because Wilson's Creek does not have any proposed or designated wilderness areas within it or adjacent to it, this impact topic is not evaluated further in this EA.

**Indian Trust Resources:** Indian trust assets are owned by Native Americans but held in trust by the United States. The Bureau of Indian Affairs and the National Park Service have formed a

joint agency, the National Interagency Center, to handle wildfire management on Indian trust lands based on fire management plans approved by the Indian landowner. According to National Park Service personnel, Indian trust assets do not occur within Wilson's Creek National Battlefield and, therefore, are not evaluated further in this EA.

**Resource Conservation, Including Energy, and Pollution Prevention:** The National Park Service's *Guiding Principles of Sustainable Design* provides a basis for achieving sustainability in facility planning and design, emphasizes the importance of biodiversity, and encourages responsible decisions. The guidebook articulates principles to be used such as resource conservation and recycling. Proposed project actions would not minimize or add to resource conservation or pollution prevention in the park and, therefore, this impact topic is not evaluated further in this EA.

Table 1-1. Impact Topics for Wilson's Creek National Battlefield Fire Management Plan  
Environmental Assessment

Impact Topic	Retained or Dismissed from Further Evaluation	Relevant Regulations or Policies
Geology and Soils	Retained	NPS <i>Management Policies</i> 2001
Water Resources	Retained	Clean Water Act; Executive Order 12088; NPS <i>Management Policies</i>
Floodplains and Wetlands	Retained	Executive Order 11988; Executive Order 11990; Rivers and Harbors Act; Clean Water Act; NPS <i>Management Policies</i>
Vegetation	Retained	NPS <i>Management Policies</i>
Wildlife	Retained	NPS <i>Management Policies</i>
Air Quality	Retained	Federal Clean Air Act (CAA); CAA Amendments of 1990; NPS <i>Management Policies</i>
Visitor Use and Experience	Retained	NPS <i>Management Policies</i>
Human Health & Safety	Retained	NPS <i>Management Policies</i>
Cultural Resources	Retained	Section 106; National Historic Preservation Act; 36 CFR 800; NEPA; Executive Order 13007; Director's Order #28; NPS <i>Management Policies</i>
Socioeconomics	Retained	40 CFR Regulations for Implementing NEPA; NPS <i>Management Policies</i>
Park Operations	Retained	NPS <i>Management Policies</i>
Threatened and Endangered Species and their Habitats	Retained	Endangered Species Act; NPS <i>Management Policies</i>
Utilities	Dismissed	NPS <i>Management Policies</i>
Noise	Dismissed	NPS <i>Management Policies</i>
Waste Management	Dismissed	NPS <i>Management Policies</i>
Transportation	Dismissed	NPS <i>Management Policies</i>
Land Use	Dismissed	NPS <i>Management Policies</i>
Environmental Justice	Dismissed	Executive Order 12898
Ecologically Critical Areas	Dismissed	Wild and Scenic Rivers Act; 36 CFR 62 criteria for national natural landmarks; NPS <i>Management Policies</i>
Prime and Unique Agricultural Lands	Retained	Council on Environmental Quality 1980 memorandum on prime and unique farmlands
Wilderness	Dismissed	The Wilderness Act; Director's Order #41; NPS <i>Management Policies</i>
Indian Trust Resources	Dismissed	Department of the Interior Secretarial Orders No. 3206 and No. 3175
Resource Conservation, Including Energy, and Pollution Prevention	Dismissed	NEPA; NPS <i>Guiding Principles of Sustainable Design</i> ; NPS <i>Management Policies</i>



## Chapter 2 - Issues and Alternatives

This Chapter describes the range of alternatives, including the Preferred Alternative and No Action Alternatives, formulated to address the purpose of and need for the proposed project. These alternatives were developed through evaluation of the comments provided by individuals, organizations, governmental agencies, and the Interdisciplinary Team.

### 2.1 ALTERNATIVES CONSIDERED AND ANALYZED IN THIS EA

#### 2.2.1 *Alternative 1 (No Action Alternative) - Implement the 1986 Fire Management Plan*

This alternative would continue the fire program described in the 1986 Fire Management Plan, however, it would not be updated to reflect current fire policy guidance. Without a revised plan reflecting current fire policy only wildland fire suppression and public education related to suppression efforts would continue. The fire program would not benefit from updates to fire management policy. Because the fire program does not meet current policy mandates no prescribed fire, mechanical or chemical treatment projects would be approved and implemented.

Under this alternative all wildfires would be suppressed while providing for the safety of employees, visitors, and park neighbors. This alternative would also protect from un-wanted fire National Register properties comprising 1750 acres, 27 structures on the List of Classified Structures, over 50 archeological sites, features of the cultural landscape, and other park assets. Protection would also be provided to threatened and endangered species (i.e. gray bats and Missouri bladderpod) by avoiding or mitigating significantly adverse impacts from wildland fire and suppression activities. Finally, this alternative would increase public awareness of the importance of fuel management and wildland fire suppression.

From 2005 through 2012 the NPS would suppress all wildland fires. Based on previous wildland fire occurrences (1 every 2 years) we would expect to suppress approximately 4 wildfires at less than 10 acres each. The **total acreage affected by wildland fire** from 2005 through 2012 is expected to be **under 40 acres**. Under this alternative **no acreage will be treated with prescribed fire**. Mechanical thinning, mowing, and chemical treatment of exotic species would be limited to what park staff and funding could support. **Mechanical thinning** would be limited to 3 acres per year or **24 acres in total**. **Mowing exotic species** would be limited to 100 acres per year or **800 acres total**. **Chemical treatment of exotic species** would be limited to less than 5 acres per year or **40 acres total**.

#### 2.2.2 *Alternative 2 (Proposed Action) –Suppression Of All Wildland Fires; Use Prescribed Fire In All Burnable Habitats*

This alternative would update the 1986 Fire Management Plan to reflect current fire policy guidance. Under this alternative all wildfires would be suppressed while providing for the safety of employees, visitors, and park neighbors. This alternative would also protect from un-wanted

fire National Register properties comprising 1750 acres, 27 structures on the List of Classified Structures, over 50 archeological sites, features of the cultural landscape, and other park assets. Protection would also be provided to threatened and endangered species (i.e. gray bats and Missouri bladderpod) by avoiding or mitigating significantly adverse impacts from wildland fire, prescribed fire, and suppression activities. Under this alternative prescribed fire and fuel management projects would be implemented while providing for the safety of employees, visitors, and park neighbors and using the best available scientific information and technology to support, monitor, and adaptively manage for the benefit of natural resources and the cultural landscape. This alternative would use prescribed fire and fuel management projects to increase the distribution and abundance of the Missouri Bladderpod, manage natural resources, rehabilitate and interpret the historic cultural landscape, maintain the ecological integrity of habitat and improve glade habitats, and reduce exotic species. Finally, this alternative would increase public awareness of the role of fire in natural processes and the use of fire as a management tool to restore natural habitat and rehabilitate the cultural landscape.

From 2005 through 2012, on average each year, the NPS would apply prescribed fire to 660 acres; mechanically thin 41 acres of brush, forest, and tornado damaged trees; mechanically treat (mow) 630 acres of exotic species; and chemically treat 20 acres of exotic species. In total the NPS would apply **prescribed fire to 5,274 acres; mechanically thin 328 acres of brush, forest, and tornado damaged trees; mechanically treat (mow) 5,040 acres of exotic species; and chemically treat 160 acres of exotic species.**

### *2.2.3 Environmentally Preferred Alternative*

The National Park Service is required to identify the environmentally preferred alternative(s) for any of its proposed projects. That alternative is the alternative that will promote the national environmental policy expressed in NEPA (Section 101 (b)). This includes alternatives that:

- 1) fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;
- 2) ensure for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings;
- 3) attain the widest range of beneficial uses of the environment without degradation, risk of health or safety, or other undesirable and unintended consequences;
- 4) preserve important historic, cultural, and natural aspects of our national heritage and maintain, wherever possible, an environment that supports diversity and variety of individual choice;
- 5) achieve a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities; and
- 6) enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources.

In essence, the environmentally preferred alternative would be the one(s) that “causes the least damage to the biological and physical environment; it also means the alternative which best protects, preserves, and enhances historic, cultural, and natural resources” (DOI, 2001).

In this case, the Proposed Action is the environmentally preferred alternative for Wilson's Creek since it best meets goals 1, 2, 3, and 4 described above. Under this alternative, fire management activities would help restore natural ecological processes, enhance habitat for an endangered species, promote an environment that allows for both historic interpretation and recreation uses, reduce hazardous fuel loadings and thus reduce risk of destructive wildland fires, and preserve historic sites and cultural landscapes that enhance understanding of our national heritage. This alternative best protects and helps preserve the historic, cultural, and natural resources in the park for current and future generations.

## 2.2 ALTERNATIVES CONSIDERED BUT NOT ANALYZED FURTHER IN THIS EA

### 2.2.1 *Revision of the 1986 Fire Management Plan to use mowing and haying for vegetation management purposes, but exclude use of prescribed fire.*

Excluding use of prescribed fire and using only mowing and haying to manage vegetation was considered but rejected. The rehabilitation and preservation of the cultural landscape of the battlefield would be most difficult without the use of prescribed fire. Fire is an integral part of the prairie and savanna ecosystems that were an important part of the historic scene. Use of prescribed fire to restore and maintain such areas is a well accepted practice, mimicking natural processes. Fire rids prairies and savannas of invasive species that can out-compete native plants. Most native species are deep-rooted and survive fire well, returning quickly after burning. Fire also returns nutrients to the soil. Mowing and haying can provide benefits, particularly in conjunction with a regular burn program. But use of machinery has disadvantages, such as soil compaction and noise. Mowing has other limitations. It is not practical in areas of steep terrain and heavily forested and heavy brush habitats. Use of mowing and haying creates a “block” pattern of vegetation inconsistent with the historic scene (NPS, 1987) Excluding fire would also likely require increased use of herbicides to control unwanted species. Finally, fire exclusion allows fuel build-up which could increase the chances of catastrophic wildland fires. For these reasons, this alternative was not further considered.

## 2.3 MITIGATION MEASURES AND MONITORING

### 2.3.1 Mitigation Measures

Mitigation measures are prescribed to prevent and/or mitigate adverse environmental impacts that may occur from fire management activities.



### 2.3.1.1 Sensitive Natural Resource Protection

- Using prescribed fire in glades under Alternative 2 has the potential to impact areas where the federally endangered Missouri bladderpod is found. Fire has the potential to positively or negatively affect the species. In order to mitigate potential impacts of fuel treatment projects park staff will:
  - Suppress all wildland fires.
  - Conduct prescribed burning, mechanical and chemical fuel treatment between the dates of July 1 and October 15<sup>th</sup>. The only two exceptions will be for annual brome control. Brome grasses will be mechanically controlled by cutting the seed heads off the plant at the dough stage, typically from April 15 – 30. This work will be accomplished by hand under close supervision to limit damaging the flowers of Missouri bladderpod and therefore prevent adverse impacts. In years when no Missouri bladderpod plants have germinated spring fires will be conducted to control brome grasses. Because this work will be accomplished when plants are not growing there will be no adverse impacts.
  - Continue to monitor the species.
- Smoke from fires, prescribed and wild, could impact the Federally listed gray bat in caves in the park. In order to mitigate potential impacts park staff will:
  - Suppress all wildland fires.
  - Continue to restrict access to caves within Wilson's Creek National Battlefield.
  - Resource Management staff will check caves yearly for the presence of Gray bats. Report yearly findings to the U.S. Fish and Wildlife Service and the Missouri Department of Conservation.
  - Designate a 300 foot buffer zone around the cave that harbored Gray bats in 1996. No vegetative disturbance will be allowed including burning within this zone.
  - Resource Management staff will check caves for the presence of Gray bats before conducting prescribed burns. If bats are confirmed present prescribed burning activities will be conducted between 9:00 am and 4:00 pm under conditions of a mixing height of at least 2,000 feet to permit maximum smoke dispersal.
  - Maintain a continuous corridor of trees at least one canopy wide (based on the canopy of a typical mature, bottomland, hardwood species) on both sides of Wilson Creek.
- In rare (cold winter) cases bald eagles roost in several trees along Wilson Creek while feeding. Park staff will not cut standing trees along Wilson Creek unless they present an immediate safety hazard.
- Historic trees require some protection. Historic trees are a contributing resource to the cultural landscape. Prior to use of prescribed fire, park managers would work to identify those trees with historical importance, and avoid use of fire in areas that might impact them. Particular care would be taken with species known to be fire-sensitive.

#### 2.3.1.1 *Sensitive Cultural Resource Protection*

- There are numerous archeological and cultural resources to be protected throughout the unit. Historic properties are generally located along the east side of the Battlefield. The entire unit is a National Register property and a cultural landscape. Every effort will be made to protect archeological sites both known and those discovered as a result of fire on the landscape. Because many of the historic and cultural areas are near roads protection from wildland fire should not be difficult.
- Cultural and archeological sites are generally at or below ground surface and subject to more damage from suppression actions than fire itself. Buenger (2004) found that prescribed fires in grassland fuels has a limited impact on surface archaeological materials. Thermal alteration of artifacts analyzed from the Homestead and Pipestone National Monument collections, which were subjected to prescribed burning in grassland fuels, was not significant.
- In all locations every effort will be made to avoid damage to identified resources during suppression and prescribed fire operations. Archeologists or cultural resource specialists will be involved in all operations to the maximum extent feasible.
- Suppression tactics to be used at Wilson's Creek include use of water or foam firelines in conjunction with natural and man made barriers to reduce damage potential from suppression actions. Water will normally be supplied by engines operating from established roads and/or trails. There are several management constraints:
- When fire lines must be constructed techniques requiring the least disturbance (i.e. leaf blown lines, mowed lines) will be used first. In extremely rare circumstances when less disturbing techniques are ineffective the use of bulldozers or heavy equipment in suppression operations may be authorized by the Superintendent or designee. Engines will be restricted from areas identified as potentially affected by vehicle traffic where rutting, soil compaction or other habitat damage could occur.
- Handlines will a last resort and will only be constructed in areas where damage to archeological and/or historic resources is not likely to occur.
- Sensitive historic sites will be protected using the least damaging tools and techniques.

#### 2.3.1.2 *Human Health and Safety*

- The small size of the park, the proximity to new subdivisions, and the possibility of smoke impacting nearby roads requires particular emphasis on safety during prescribed fires. Prior to prescribed fires, notification of nearby residents will be carried out. During burns, roads will be signed and park staff will be posted at roads that could be impacted by smoke to divert motorists to other routes.

#### 2.3.1.3 *Air Quality*

- Air quality in the region is generally good. However, due to the proximity of the towns of Battlefield, Republic, and Springfield attention must be given to possible short-term impacts to air quality due to prescribed burns. The proposed FMP includes the following

mitigations:

- Prescribed fires – Fires to improve resource values will have a smoke dispersion component in the prescription. If smoke creates a prolonged hazard or significant nuisance, appropriate actions will be taken to mitigate the condition causing the problem or the fire will be suppressed.
- Suppression – Smoldering fuels will be suppressed or mopped up when they are likely to generate smoke management "problems."
- Ignition – Smoldering fuels will be ignited to get them to burn with an active flame, which generates less than half the emissions than smoldering combustion. Flaming combustion also generates convection columns, which raise smoke above ground level.
- Dispersion – The FMO and the Chief of Resources Management will recognize poor dispersion conditions that will last several days, such as the predicted passage of a slow-moving warm front; a lingering high pressure system with stable atmosphere; or high humidity conditions, and adjust burning strategies as necessary.
- Residual Smoke – When a fire has burned for an extended period of time and generated a lot of residual smoke, the NPS will consider appropriate actions to minimize additional smoke production.
- Firefighter Safety – During high smoke production phases of a fire suppression operation, crews will be rotated out of high smoke areas.
- Sensitive Areas – Planned prescribed fire ignitions in sensitive areas will be done either when visitation is low, or the Superintendent will restrict entry to areas potentially impacted by smoke.

#### 2.3.1.4 *Visitor Experience and Use*

- Prescribed fires have the potential to impact visitor experience through possible road closures or restrictions on particular areas of park use. In order to make the general public aware of such hazards, the following mitigation measures will be considered:
- General public will be made aware of wildland fires and prescribed fires through press releases and general interpretive presentations.
- The general public will not be allowed access to any areas affected by fire.
- Appropriate regulatory and/or enforcement agencies will be notified prior to any prescribed burns to assist in safely managing pedestrian, equestrian or vehicular traffic. Warning signs will be posted along roads and trails as necessary.

#### 2.3.1.5 *Cultural Resources*

- Prior to all fire management activities, cultural resources in treatment areas would be identified and avoided to the extent possible. Mechanical treatments and prescribed fire will be used to reduce fuel loads near historical structures.

#### 2.3.1.6 *Utilities*

- Prior to all fire management activities, current and abandoned utility lines would be identified and avoided.

### 2.3.2 Monitoring

Wilson's Creek is in the process of developing a plan for monitoring fire behavior and fire effects for prescribed burns. Data will include such information as weather, fire behavior, and acreage burned. Both short-term and long-term monitoring will be addressed in the plan. Short-term monitoring looks at measurable changes immediately following a fire, such as vegetative response and fuel reduction. Long-term monitoring looks at changes over a multi-year period, such as changes in vegetative composition, wildlife use, and vista maintenance. A baseline plant community monitoring study for the years 1998-2000 has also been conducted (De Backer, 2001) in burn units. This monitoring is a part of the Prairie Cluster's Long Term Ecological Monitoring (LTEM) program. Three LTEM plots are currently used to assess long term changes to vegetation, however, additional fire plots will be added and integrated into the monitoring program.

## Chapter 3 – Affected Environment and Environmental Consequences

This chapter summarizes the existing environmental conditions and the probable environmental consequences (effects) of implementing the action and No-Action alternatives. This chapter also provides the scientific and analytical basis for comparing the alternatives. The probable environmental effects are quantified where possible; where not possible, qualitative descriptions are provided.

### 3.1 GEOLOGY AND SOILS (INCLUDING PRIME AND UNIQUE FARMLANDS)

#### 3.1.1 *Affected Environment*

Igneous rock in Missouri was formed during the Archeozoic and Proterozoic eras by solidification of molten magma. These rocks lie at varying depth with surface exposure only in the St. Francis Mountains. When the magma hardened, the St. Francis Mountain area was slowly upthrust to an elevation of about 2,000 feet, carrying the Ozark Plateau with it. From this time until the last upthrust in the Cenozoic era, the area settled, faulted, was covered by the inland sea, and received mineral deposits. Following the St. Francis uplift, the plateau was eroded by winds and streams, ultimately forming the Ozark Mountains. Surrounding the igneous core in concentric pattern are sedimentary rocks of sandstone and dolomitic and calcitic limestone of the Ordovician and Mississippian ages (NPS, 1977b).

Soils are mostly formed from weathering of underlying parent material, with alluvial soils along the streams. They range from deep stony and cherty silt loams (Chert Hills type) to shallow soils of 9 to 20 inches underlain with fractured limestone (Limestone ledge type) (NPS, 1986). Chert Hills are characterized by soil that is up to 80% chert by volume, with subsoils ranging from slightly weather chert to dense chert pans. These soils have low water retention and available nutrient characteristics. Limestone ledge areas have surface textures varying from a silty clay loam to stoney clay loam, with low water retention and nutrient qualities (NPS, 1977b).

Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for these uses (the land could be cropland, pastureland, forest land, or other land, but not urban built-up land or water). It has the soil quality, growing season, and moisture supply needed to economically produce sustained high yields of crops when treated and managed, including water management, according to acceptable farming methods (Missouri NRCS Field Office, 2000).

The following prime farmland soils and soils of statewide importance have been determined to be found at Wilson's creek:

Prime Farmland	Acreage	Erosion Hazard
1B Newtoina silt loam	52.5 acres	
2B Pembroke silt loam	72 acres	slight
21B Peridge silt loam	164 acres	slight
55 Huntington silt loam	182 acres	slight
Statewide Importance		
5C Wilderness cherty silt loam	346 acres	slight
921 Secesh-Cedargap silt loams	91 acres	slight

About 908 acres, just slightly over 50% of the total acres comprising the Park, fall into the category of prime farmland or soils of state importance. Most of the acreage that falls in the Peridge silt loam category is currently being farmed as hay fields (Sharp Cornfield and Sharp Suttlefield), as is some acreage that falls in the Secash-Cedargap, Wilderness, and Pembroke categories (Gibson Oatfield and Ray Cornfield and Orchard).

### 3.1.2. *Environmental Consequences*

*Soil impacts were qualitatively assessed using soil characteristics, literature reviews, and mitigation measures.*

#### 3.1.2.1 *Alternative 1 – No Action - Implement the 1986 Fire Management Plan*

Proposed activities with the potential to impact soils include clearing fire lines and driving fire suppression equipment on trails and roads within the park. Existing infrastructure (i.e. roads, trails, mowed fence lines) and natural boundaries (i.e. streams) will be used for fire lines whenever possible. When fire lines must be constructed techniques requiring the least disturbance (i.e. leaf blown lines, mowed lines) will be used first. In rare circumstances, and only when approved by the superintendent, when less disturbing techniques can't be used fire line construction could result in soil disturbance and lead to increased erosion, especially on steeply sloped areas within the park. To avoid these potential impacts, fire lines would be located outside of highly erosive areas, steep slopes, and other sensitive areas. Following fire suppression activities, fire lines would be re-contoured and water barred if necessary.

Conclusion: The no action alternative would have negligible effects to soils and geologic resources (including prime and unique farmlands). The infrequent wildfires that occur within the Battlefield are easily suppressed along existing natural or man-made boundaries using hose lays or pumper trucks.

### 3.1.2.2 *Alternative 2 (Proposed Action) –Suppression Of All Wildland Fire; Use Prescribed Fire In All Burnable Habitats*

Proposed activities with the potential to impact soils include clearing fire lines, driving fire suppression equipment on trails and roads within the park, and conducting prescribed fires. Existing infrastructure (i.e. roads, trails, mowed fence lines) and natural boundaries (i.e. streams) will be used for fire lines whenever possible. When fire lines must be constructed techniques requiring the least disturbance (i.e. leaf blown lines, mowed lines) will be used first. In rare circumstances, and only when approved by the superintendent, when less disturbing techniques can't be used fire line construction could result in soil disturbance and lead to increased erosion, especially on steeply sloped areas within the park. To avoid these potential impacts, fire lines would be located outside of highly erosive areas, steep slopes, and other sensitive areas. Following fire suppression activities, fire lines would be re-contoured and water barred if necessary. Prescribed fires would increase the potential for soil loss, however, the benefits of prescribed fires on natural vegetation communities would help alleviate these losses.

Conclusion: The proposed action alternative would have minor, short-term effects to soils and geologic resources (including prime and unique farmlands). The infrequent wildfires that occur within the Battlefield are easily suppressed along existing natural or man-made boundaries using hose lays or pumper trucks. Loss of soil after prescribed fires would be short in duration.

## 3.2 WATER RESOURCES (INCLUDING FLOODPLAINS)

### 3.2.1 *Affected Environment*

The principal aquatic feature at the park is Wilson's Creek and its tributary, Schuyler Creek (Skeggs Branch). Wilson's Creek arises in the city of Springfield and traverses the park from north to south for a distance of three miles. At normal flow, the stream is approximately 30 to 35 feet wide and 5 to 6 feet deep. A mile south of the park the creek joins the James River. The park also contains numerous springs and sinkholes.

Wilson's Creek is subject to floods. Flooding has periodic, short term effects on adjacent vegetation and results in erosion to the stream banks of Wilson's Creek and flooded surfaces.

Water quality has been a continuing issue at Wilson's Creek. Threats to water quality within the park include Springfield's southwest wastewater treatment plant, agricultural runoff, storm water runoff, and accelerated growth of nearby communities. These threats require continued water quality monitoring to assure the protection of aquatic resources and visitor safety within the park.

The Battlefield is near six communities and lies within two counties experiencing large population growth. It is downstream from Springfield (population 150,580) which discharges 42.5 million gallons of treated sewage effluent each day. During low flow periods an estimated 80% of the water flowing through Wilson's Creek National Battlefield is treated sewage effluent. In the summer of 1996 raw sewage was spilled into Wilson Creek which caused a fish kill in the

park. Missouri Department of Natural Resources investigated and fined the City of Springfield (NPS, 1999).

Monitoring water quality will be necessary as long as the threat of sewage spills is present. Water quality monitoring continues at Wilson's Creek in the form of macro-invertebrate sampling. This type of monitoring is effective at documenting overall stream health, however, the data cannot be used to determine if the stream is out of compliance with state water quality standards.

The broad floodplain of Wilson's Creek, a narrow band bordering McElhaney Branch, and a narrow zone along the lower one-third mile of Skegg's Branch (also known in the past as Shuyler, Schuler, and Schuyler Creek), are developed in alluvial sediments. A narrow bank that borders either side of the floodplain of Wilson's Creek, as well as some of its tributaries, including the upper reaches of Skegg's Branch, are developed in the Elsey formation (NPS, 2004).

### *3.2.2 Environmental Consequences*

Water resource impacts were qualitatively assessed literature reviews.

#### *3.2.2.1 Alternative 1 (No Action) - Implement the 1986 Fire Management Plan*

Proposed activities with the potential to impact water resources include clearing fire lines, and vehicle use associated with suppression activities.

Fire line clearing would result in a temporary and minor increase in soil erosion. Increased erosion would result in very minor and temporary sedimentation of Wilson's Creek. There would be very minor vegetation impacts within the floodplain and hydrology of all park water resources would not be affected.

Conclusion: The no action alternative would have negligible effects to water resources (including floodplains). The infrequent wildfires that occur within the Battlefield are easily suppressed along existing natural or man-made boundaries using hose lays or pumper trucks. Soil loss creating sedimentation would be short-term. Wildfires rarely occur in the floodplain along Wilson's Creek and the impacts would be minor.

#### *3.2.2.2 Alternative 2 - (Proposed Action) -Suppression Of All Wildland Fire; Use Prescribed Fire In All Burnable Habitats*

General water resources impacts under Alternative 2 would be similar to those described under the No Action Alternative. Due to the use of prescribed fire, there would be a greater possibility of impacts to water resources, but these would still be minor and short-term.

Conclusion: The proposed action alternative would have minor, short-term effects to water resources (including floodplains). The infrequent wildfires that occur within the Battlefield are easily suppressed along existing natural or man-made boundaries using hose lays or pumper trucks.



Loss of soil after prescribed fires creating sedimentation would be short-term. Wildfires and prescribed fires rarely occur in the floodplain along Wilson's Creek and the impacts would be minor.

### 3.3 VEGETATION

#### 3.3.1 *Affected Environment*

Ecologically, the park is located at the far-western edge of the eastern broadleaf forest province near the edge of the prairie parkland province (Bailey 1995). Historical documentation describes much of the park landscape as savanna (Missouri Department of Conservation 1986). Savanna is a fire-dependent environment that supports an understory of herbaceous, prairie species and an overstory of scattered trees. At the time of the battle, oaks were the dominant trees in the park area. In uncultivated areas, blackjack oak *Quercus marilandica* dominated the uplands, while other species of oaks were present in smaller numbers. Black oak *Quercus velutina*, white oak, and post oak *Quercus stellata* were dominant overstory species in the draws and bottoms (NPS, 2003).

Although native plants were present in the area in 1861, much of the landscape supported agricultural fields prior to the Civil War. After the war, agricultural use of the land intensified with additional fields plowed and grazed. In addition, as agriculture expanded in the late 1800s and early 1900s, suppression of fires increased. The result of fire-suppression tactics, which decreased the frequency and extent of fire, was a gradual succession of uncultivated fields to thick, second-growth forests (NPS, 2003).

Vegetative communities at Wilson's Creek National Battlefield currently include a mosaic of mature forest, riparian woodland, prairie, and cultivated hay fields. Each community type is present in various densities and successional stages indicative of changes in land-use patterns and/or fire suppression. For instance, some areas support high densities of red cedar that indicate succession from open fields or oak woodlands that have been affected by fire suppression activities. Some woodland areas were cleared prior to establishment of the battlefield and are populated by pasture or exotic grasses (NPS, 2003).

A 1986 plan for restoring historic vegetation estimated that half of the park was essentially treeless, and half supported substantial woody vegetation in the form of forests and successional fields (Gremaud, 1986). This study describes several types of grasslands, including fescue fields (the largest vegetation class in the park, at 31%), and old and new prairie plantings of varied quality. Native grasses in prairie plantings included Indian grass and little bluestem, with some big bluestem, sideoats grama, and occasionally switchgrass. This study reported pastures or hayland in some stage of being taken over by woody vegetation, as making up approximately 12% of the landscape. A remnant of the native post oak savannah compromised a small fraction of the park, approximately 1%. Exotic savanna, mostly honey locust over fescue, also was noted.

Exotic species are of concern in the park; an estimated 500 park acres are infested with exotic plant species such as tall fescue, musk thistle, honey locust, and common mullein. Park staff

have identified the seven most invasive exotic plant species in the park for which there are feasible control measures available as priority species for management. These include three species of brome (*Bromus* spp.), Multiflora Rose (*Rosa multiflora*), Musk thistle (*Carduus nutans*) Johnsongrass (*Sorghum halepense*), and Chinese bushclover (*Lespedeza cuneata*) (DOI, 1999b). The *Bromus* species and the *Lespedeza cuneata* are of particular concern because they are invading the habitat of the Missouri bladderpod (*Lesquerella filiformis*). This species, described in a later section, is a Federally endangered plant found only in four Missouri counties and two counties in Arkansas.

### 3.3.2 *Environmental Consequences*

Vegetation impacts were qualitatively assessed using literature reviews.

#### 3.3.2.1 Alternative 1 – No Action - *Implement the 1986 Fire Management Plan*

The total acreage affected by wildland fire from 2005 through 2012 is expected to be under 40 acres. Under this alternative no acreage will be treated with prescribed fire. Mechanical thinning, mowing, and chemical treatment of exotic species would be limited to what park staff and funding could support. Mechanical thinning would be limited to 3 acres per year or 24 acres in total. Mowing exotic species would be limited to 100 acres per year or 800 acres total. Chemical treatment of exotic species would be limited to less than 5 acres per year or 40 acres total.

Conclusion:

Implementation of the current FMP would have a moderate, long-term adverse impact on the park's native vegetation. Native fire-adapted and fire-dependant plant species would be negatively impacted. Glade and savanna plant communities would suffer from woody vegetation encroachment.

#### 3.3.2.2 Alternative 2 - *(Proposed Action) –Suppression Of All Wildland fire; Use Prescribed Fire In All Burnable Habitats*

From 2005 through 2012, on average each year, the NPS would apply prescribed fire to 660 acres; mechanically thin 41 acres of brush, forest, and tornado damaged trees; mechanically treat (mow) 630 acres of exotic species; and chemically treat 20 acres of exotic species. In total the NPS would apply prescribed fire to 5,274 acres; mechanically thin 328 acres of brush, forest, and tornado damaged trees; mechanically treat (mow) 5,040 acres of exotic species; and chemically treat 160 acres of exotic species.

Conclusion:

Implementation of the proposed action would have a positive, long-term impact on the park's native vegetation. Native fire-adapted and fire-dependant plant species would flourish. Glade and savanna plant communities would begin to recover from decades of woody vegetation encroachment. Historic trees would also be protected and preserved with fuel thinning projects.

## 3.4 WILDLIFE

### 3.4.1 *Affected Environment*

Mammals found in the park included white-tailed deer, cottontail rabbits, squirrels, coyote, red and grey fox, raccoons, bobcats, skunks, opossums, woodchucks, muskrats, beavers, field mice, moles and gophers. In addition, a colony of federally endangered gray bats, discussed in the following section, was discovered in the park in 1996.

Thirty-five species of song and insectivorous birds, common to the area, have been identified, as well as the red-tailed hawk, great blue heron and the killdeer plover. In addition, the common crow, vulture and various ducks have been observed.

Wilson's Creek National Battlefield has a somewhat rich herpetofauna. A recent study (McCallum and Trauth, 2002) found nine amphibian species (four salamanders and five anurans) and 18 reptilian species (three turtles, six lizards, and nine snakes).

### 3.4.2 *Environmental Consequences*

Wildlife impacts were qualitatively assessed using literature reviews of the effects of fire on wildlife habitat.

#### 3.4.2.1 *Alternative 1 (No Action) - Implement the 1986 Fire Management Plan*

Proposed activities with the potential to impact wildlife include clearing fire lines, and vehicle use associated with suppression activities. Some trees (including fruit and mast trees) would be killed from fire line clearing. Snags that are deemed hazardous trees would be removed. Exotic species would flourish without the use of prescribed fire.

Fire suppression activities could result in the temporary displacement of wildlife or in the mortality of individuals. The loss of individual members of a given species, however, would not jeopardize the viability of the populations on and adjacent to the park.

Conclusion:

Implementation of the current FMP would have a minor, long-term adverse impact on the park's wildlife. Native fire-adapted and fire-dependant plant species would be negatively impacted. Glade and savanna plant communities would suffer from woody vegetation encroachment. Based on observations during the inventory McCallum and Trauth. Grassland habitats had the second highest species diversity, followed by upland forest, the quarry and restored glades, and then caves/springs and littoral habitats. No amphibians or reptiles were observed in areas with complete canopy coverage of exotics such as lespedezea or multiflora rose or other thick briar areas. Furthermore, no glade inhabiting species were observed in heavily forested glades.

### 3.4.2.2 Alternative 2 - (Proposed Action) –Suppression Of All Wildland fire; Use Prescribed Fire In All Burnable Habitats

Habitat conditions for many wildlife species that inhabit Wilson's Creek National Battlefield would improve with the restoration of the historic high-frequency, low-intensity fire regime characteristic of this area prior to the twentieth century. Such a fire regime would help restore and enhance the variety and diversity of native plant and wildlife habitats. Nutrients released to plants through the fertilization effects of ash would provide an important source of nutrition for wildlife in the area. In the aftermath of a fire, for a season or more, plant growth tends to be more nutritious than that of unburned areas, containing more protein and nutrients and less lignin and crude fiber. While some trees (including fruit and mast trees) would be killed from the effects of fire, these dead standing trees (snags) would be left as these provide important habitat for a variety of wildlife species. Snags that are deemed hazardous trees would be removed.

All the fire management activities could result in the temporary displacement of wildlife or in the mortality of individuals. The loss of individual members of a given species, however, would not jeopardize the viability of the populations on and adjacent to the park. Wildlife populations native to the region are adapted to and can survive fire. Others prefer the forage and browse that will emerge after fires; still others, such as deer, ruffed grouse, and turkey, may actually be dependent upon the habitat conditions created by fires (Hunter, 1990).

Based on observations during the inventory McCallum and Trauth stated that species richness may not interact with prescribed burning, however, the inventory was not statistically designed to test this observation. The highest species richness was observed in the riparian forests of the park. Grassland habitats were next, followed by upland forest, the quarry and restored glades, and then caves/springs and littoral habitats. No amphibians or reptiles were observed in areas with complete canopy coverage of exotics such as lespedezea or multiflora rose or other thick briar areas. Furthermore, no glade inhabiting species were observed in heavily forested glades.

#### Conclusion:

Implementation of the proposed action would have a positive, long-term impact on the park's wildlife. Habitat that provides support to amphibians and reptiles would flourish, nutrients would be quickly recycled, and exotic species would be controlled.

## 3.5 THREATENED AND ENDANGERED SPECIES

### 3.5.1 Affected Environment

The U.S. Fish and Wildlife Service reports three Federally threatened, endangered, or candidate species within the bounds of Wilson's Creek National Battlefield: gray bat (*Myotis grisecens*, endangered), and Missouri bladderpod (*Lesquerella filiformis*, threatened) (Salveter, 2002). In addition Federally threatened bald eagles (*Haliaeetus leucocephalus*) migrate through the park and often utilize the park as a winter roosting and feeding site (NPS, 1999). The park has also been managing for the royal catchfly (*Silene regia*). This rare plant was until recently a Federal

candidate species, but was removed from Federal listing because it was found to have too many populations in Missouri to warrant national listing (Georgia DNR website, 2002).

#### Gray bat

The gray bat occupies a limited geographic range in limestone karst areas of the southeastern United States, including Missouri. With rare exception, the gray bat roosts in caves year-round. In winter, most gray bats hibernate in vertical (pit) caves with cool stable temperatures below 10 degrees C. Summer caves, especially those used by maternity colonies, are nearly always located within a kilometer (0.6 mile) of rivers or reservoirs over which bats feed. The summer caves are warm, with dome ceilings that trap body heat. Most gray bats migrate seasonally between hibernating and maternity caves, and both types of caves are located in Missouri. Gray bats are active at night, foraging for insects over water or along shorelines, and they need a corridor of forest riparian cover between roosting caves and foraging areas. They can travel as much as 20 kilometers (12 miles) from their roost caves to forage (Salveter, 2002).

An inventory of cave resources initiated by park staff in 1996 led to the discovery of a small population of gray bats (less than 50 individuals) hibernating in a cave in the park. This species had not been documented in the park before and represents a significant resource for the park (1999b).

#### Missouri Bladderpod

The Missouri Bladderpod is an herbaceous, winter annual belonging to the mustard family. The species presently occurs in shallow soils on limestone glades and outcrops in pastures, and rarely in rocky open woods in Southwest Missouri and Northwest Arkansas. The presence of numerous eastern red cedar trees is often linked to Missouri bladderpod habitat. Yellow flowers appear at the tops of the 4 to 8 inch tall plants in April and May. Individual plants produce fruit and drop their seeds by the end of June. The seeds lie dormant through the summer, germinate in the fall, and overwinter as basal rosettes (a cluster of leaves near the ground) (Salveter, 2002).

Bloody Hill Glade supports one of the largest protected populations of the federally endangered Missouri Bladderpod. Four smaller populations occur on other glades within the park. Missouri Bladderpod population size has been monitored on Bloody Hill since 1988. A 1990 population study outlines management recommendations to restore Missouri Bladderpod habitat. In conjunction with the historic landscape restoration program, glade management, including exotic species control, woody removal, and introduction of native grass seed has occurred since 1991 (NPS, 1999).

#### Bald eagle

Bald eagles are common migrants and winter residents throughout the state and are uncommon breeders along some of the major rivers and large reservoirs. During very cold winters when the lakes and rivers are frozen in Northern Missouri bald eagles occasionally perch on several trees along Wilson's Creek. The eagles typically stay one or two days each year, however, some winters they do not visit the park at all.

### Royal catchfly

This member of the pink family is found in rocky prairies; rocky, open woods; thickets; and borders of rocky glades. The plant grows 2-4 feet tall, and flowers in July and August (Conservation Commission of Missouri, 2002). As a prairie species, the royal catchfly is fire-adapted.

### *3.5.2 Environmental Consequences*

#### *3.5.2.1 Alternative 1: Implement the 1986 Fire Management Plan*

It is possible that smoke from wildland fires could injure or kill gray bats if a substantial amount of smoke enters a cave where bats roost. Maternity colonies may also be adversely impacted by fire. Adult bats would be capable of fleeing smoke; however, if a maternity colony of flightless young were inundated with smoke, it could severely injure or kill the young (USFS, 2001).

Smoke from wildland fires might also result in temporary disturbance to migrating eagles feeding or roosting in winter. However, any disturbance would be very transitory, especially given the mobility of the species.

The lack of prescribed fire would negatively impact habitat for the Missouri bladderpod and royal catchfly.

#### **Conclusion:**

Implementation of the current FMP would have a moderate, long-term adverse impact on the park's threatened species. The lack of prescribed fire would cause woody vegetation encroachment which would negatively impact Missouri bladderpod and royal catchfly.

#### *3.5.2.2 Alternative 2: (Proposed Action) – Suppression Of All Wildland fire; Use Prescribed Fire In All Burnable Habitats*

It is possible that smoke from fires could injure or kill gray bats if a substantial amount of smoke enters a cave where bats roost. Maternity colonies may also be adversely impacted by fire. Adult bats would be capable of fleeing smoke; however, if a maternity colony of flightless young were inundated with smoke, it could severely injure or kill the young (USFS, 2001). Mitigation measures outlined in this EA and the Draft FMP would make the effect negligible.

In rare (cold winter) cases bald eagles roost in several trees along Wilson Creek while feeding. Park staff will not cut standing trees along Wilson Creek unless they present an immediate safety hazard. Smoke from fires might result in temporary disturbance to migrating eagles feeding or roosting in winter. However, any disturbance would be very transitory, especially given the mobility of the species. Additionally, the use of fire during the winter season, when eagles would be most likely to congregate, would be infrequent. If nesting eagles were discovered, use of fire in proximity to nests

would be avoided. Mitigation measures outlined in this EA and the Draft FMP would make the effect negligible.

Prescribed fires implemented with the mitigation measures outlined in the EA and the Draft FMP would improve habitat for the Missouri Bladderpod; fire would also benefit the royal catchfly.

Conclusion:

Implementation of the proposed action would have a positive, long-term impact on the park's threatened species. Prescribed fire would improve habitat conditions for the Missouri Bladderpod and royal catchfly.

## 3.6 AIR QUALITY

### 3.6.1 *Affected Environment*

Under the terms of the 1990 Clean Air Act amendments, Wilson's Creek National Battlefield is designated as a Class II quality area. By definition, Class II areas of the country are set aside under the Clean Air Act, but identified for somewhat less stringent protection from air pollution damage than Class I areas. The primary means by which the protection and enhancement of air quality is accomplished is through implementation of National Ambient Air Quality Standards (NAAQS). These standards address six pollutants known to harm human health including ozone, carbon monoxide, particulate matter, sulfur dioxide, lead, and nitrogen oxides (USDA, 2000a). The state of Missouri, with the exception of the St. Louis area, is in attainment for all NAAQS (EPA, 2002).

The Missouri Department of Natural Resources, Southwest Region, exempts authorized agencies in Christian and Greene counties from permitting requirements for prescribed burns for natural resources purpose. Their office, and local fire departments, should be notified prior to burns (Vitzthum, 2002).

### 3.6.2 Environmental Consequences

Air quality impacts were qualitatively assessed upon review of National Park Service best management practices to reduce air emissions, State of Missouri prescribed fire permit specifications and requirements, and the extent of proposed prescribed fire activities under all the alternatives.

#### 3.6.2.1 Alternative 1 – No Action - *Implement the 1986 Fire Management Plan*

Smoke from infrequent wildland fires consists of dispersed airborne solids and liquid particles, called particulates, which could remain suspended in the atmosphere for a few days to several months. Particulates can reduce visibility and contribute to respiratory problems. Very small particulates can travel great distances and add to regional haze problems. Regional haze can sometimes result from multiple burn days and/or multiple owners burning within an airshed over too short a period of time to allow for dispersion.

Conclusion:

The impacts of infrequent small wildland fires would have a negligible impact on air quality.

#### 3.6.2.2 Alternative 2 - *(Proposed Action) –Suppression Of All Wildland fire; Use Prescribed Fire In All Burnable Habitats*

Smoke from infrequent wildland fires and prescribed fires consists of dispersed airborne solids and liquid particles, called particulates, which could remain suspended in the atmosphere for a few days to several months. Particulates can reduce visibility and contribute to respiratory



problems. Very small particulates can travel great distances and add to regional haze problems. Regional haze can sometimes result from multiple burn days and/or multiple owners burning within an airshed over too short a period of time to allow for dispersion.

For prescribed fires, there are three principle strategies to manage smoke and reduce air quality effects. They include:

1. Avoidance - This strategy relies on monitoring meteorological conditions when scheduling prescribed fires to prevent smoke from drifting into sensitive receptors, or suspending burning until favorable weather (wind) conditions;
2. Dilution – This strategy ensures proper smoke dispersion in smoke sensitive areas by controlling the rate of smoke emissions or scheduling prescribed fires when weather systems are unstable, not under conditions when a stable high-pressure area is forming with an associated subsidence inversion. An inversion would trap smoke near the ground; and
3. Emission Reduction – This strategy utilizes techniques to minimize the smoke output per unit area treated. Smoke emission is affected by the number of acres burned at one time, pre-burn fuel loadings, fuel consumption, and the emission factor. Reducing the number of acres that are burned at one time would reduce the amount of emissions generated by that burn. Reducing the fuel beforehand, e.g. removing firewood, reduces the amount of fuel available. Prescribed burning when fuel moistures are high can reduce fuel consumption. Emission factors can be reduced by pile burning or by using certain firing techniques such as mass ignition.

If weather conditions changed unexpectedly during a prescribed fire, and there was a potential for violating air quality standards or for adverse smoke impacts on sensitive receptors, the park would implement a contingency plan, including the option for immediate suppression. Considering the relatively small number of acres that would be affected by prescribed fire under the proposed action over the period of eight years, approximately 5,274 acres, and in light of the current air quality in the area and review and approval of the burn permit by the Missouri Department of Natural Resources, prescribed burning would not violate daily national or state emission standards and would cause very minor and temporary air quality impacts. The greatest threat to air quality would be smoke impacts on sensitive receptors, however, this possibility would be minimized and/or eliminated if the prescribed fire plan is strictly adhered to, and if smoke minimization efforts are followed.

Conclusion:

The implementation of the proposed action would have a moderate, short-term adverse impact on air quality.

### 3.7 VISITOR USE AND EXPERIENCE (INCLUDING PARK OPERATIONS)

### 3.7.1 *Affected Environment*

Wilson's Creek National Battlefield provides visitors with access to significant Civil War battlefield sites via a five mile tour road open to motorized vehicles, bicycles, and pedestrian traffic. A seven mile trail system for horseback riding and hiking is accessible from the tour road. Eight stops along the tour road contain wayside exhibits providing information about the battle fought on April 10, 1861. Several stops include walking trails which lead visitors to sites of historical significance. A highlight along the tour road is the Ray House, which along with its springhouse is the only surviving wartime structure. A visitor center offers interpretive opportunities including a battle map presentation, a film, and historic exhibits. The visitor center also contains a Civil War library and a gift shop. Annual events, including living history presentations, draw thousands of Civil War enthusiasts to the battlefield (Rosdendahl et al., 2001). Lodging, camping, and food services are not available at the park.

A Visitor Use Study (Rosdendahl et al. 2001)) was conducted in the fall of 1999 and spring of 2000 to better understand visitor use patterns and the needs and interests of those who come to the battlefield. The study provides some insight into how the park is viewed and used.

The study found that three quarters of those surveyed visited the battlefield for two hours or less. Nearly half were making their first visit to Wilson's Creek; most first-time visitors were not residents of the area. Half of those contacted indicated that they were from the Springfield, MO area and surrounding counties. Many local residents indicated they visited on a daily, weekly, or otherwise regular basis. Thirty-eight percent of all users indicated visiting Wilson's Creek was the primary purpose of their visit to the area; 31 percent indicated that their visit to Wilson's Creek was one of several important things they planned to do; and 31 percent indicated that visiting Wilson's Creek was something they decided to do after arriving in the Springfield area. The great majority of non-local users indicated that they were visiting other local attractions in addition to Wilson's Creek during their visit.

Reasons for visiting Wilson's Creek were elicited from survey respondents. High values were placed on such reasons as enjoying the natural scenery of the area, learning about the battle at Wilson's Creek, and learning about the Civil War. In general, local respondents gave high ratings to experiences that encouraged a renewing recreational experience. In contrast, non-local respondents gave high ratings to experiences which enhanced their knowledge of the Civil War and Wilson's Creek. Upcoming community plans include connecting Springfield, MO to the battlefield with a greenways trail. This trail will provide more hikers and bicyclists access to the battlefield. (Rosendahl, et al., 2001)

Park operations are centered in the Visitors Center and nearby research and administrative facilities. Lodging, camping, and food services are not available at the park. Wilson's Creek fire program relies heavily on cooperating local, state, and federal agencies. Fire departments of the towns of Battlefield, Brookline, and Republic; Missouri Department of Conservation; and National Park Service staff from Ozark National Scenic Riverway, Buffalo National Scenic Riverways, and Pea Ridge National Military Park are among the cooperating entities. These entities not only respond to wildland fires but participate in prescribed fires. Ozark National Scenic Riverways provides a Fire Management Officer and administrative support (NPS, 1999).

### 3.7.2 *Environmental Consequences*

Recreation impacts were qualitatively assessed in light of the intensity and duration of fuel treatment activities as they related to visitor use and experience. Visual resource impacts in this EA were assessed in terms of scenic integrity, visual wholeness, and unity of the landscape. A view with high scenic integrity is ecologically intact; it has few if any discordant elements in sight and contains only positive human elements. In contrast, a view of low scenic integrity has discordant and contrasting features such as geometric shapes (e.g. clearcuts), structures that do not blend with their surroundings, or roads that create large cut and fill slopes (Galliano and Loeffler, 2000).

#### 3.7.2.1 Alternative 1 – No Action - *Implement the 1986 Fire Management Plan*

There would rarely be a short-term reduction in scenic integrity and visitor use and experience during and immediately following any wildland fire suppression activities. The most likely impacts to visual quality are from smoke during burning, from the presence of vehicles and equipment, and from the appearance of burned areas afterwards. Short-term reduction in scenic integrity, however, would be minor because fire management activities would involve only short-term presence of vehicles and people, and smoke accumulation would be temporary since prescribed fires would be ignited under favorable conditions for smoke dispersion.

Visitor use would be temporarily affected under this alternative since access to locations where crews were conducting suppression activities would be restricted.

In the event of a wildland fire within or adjacent to the park, park operations could be temporarily affected depending on the severity of the fire and situation at hand as visitors and non-essential park personnel were evacuated to off-site and safe locations.

#### Conclusion:

The effects of suppression activities on visitor use and experience during wildland fire would be moderate and short-term. Under this alternative no prescribed fires would be allowed. Therefore, any wildland fire would be in heavy fuels that would generate large quantities of smoke and could require a large suppression effort for an extended period of time.

#### 3.7.2.2 Alternative 2 - *(Proposed Action) –Suppression Of All Wildland fire; Use Prescribed Fire In All Burnable Habitats*

There would be some short-term reduction in scenic integrity and visitor use and experience during and immediately following any prescribed fire or wildland fire suppression activities. The most likely impacts to visual quality are from smoke during burning, from the presence of vehicles and equipment, and from the appearance of burned areas afterwards. Short-term reduction in scenic integrity, however, would be minor because fire management activities would involve only short-term presence of vehicles and people, and smoke accumulation would be temporary since prescribed fires would be ignited under favorable conditions for smoke dispersion. Visual quality would quickly improve in prairies and savannas as burned areas

would soon display new vegetative growth, and increased blooming of grasses and forbs. Additionally, burning would have the positive impact of helping to open up scenic vistas, providing visitors with a more authentic representation of historic battle sites.

Visitor use would be temporarily affected under this alternative since access to locations where crews were conducting prescribed fire and suppression activities would be restricted. Visitor use and experience impacts would be reduced by avoided prescribed fire activities during times of the highest public use, such as on special events days, and in particular the anniversary of the historic battle.

#### Conclusion:

Under the proposed action the effect on visitor use and experience would be moderate and short-term. Effects to park operations would be minimized under this alternative, with the aid of fire management personnel from Ozark National Scenic Riverways and other National Park Service units. In the event of a wildland fire within or adjacent to the park, park operations could be temporarily affected depending on the severity of the fire and situation at hand as visitors and non-essential park personnel were evacuated to off-site and safe locations.

## 3.8 HUMAN HEALTH AND SAFETY

### 3.8.1 *Affected Environment*

Both wildland and prescribed fires have the potential to affect human health and safety, though the risk is much lower from prescribed fire. In the case of a prescribed fire, smoke is a possible source of potential risk to firefighters and the public. Risks include that of inhalation as well as the possibility of obscuring visibility on nearby roads. Wildland fire or a prescribed fire that gets out of control presents risks from smoke, flames, and for firefighters, the possibility of injuries from use of equipment or from accidental spills of flame retardants.

### 3.8.2 *Environmental Consequences*

Human health & safety impacts were qualitatively assessed through determination of activities, equipment and conditions that could result in injury, literature review of type and extent of injury caused by equipment and conditions, and in light of mitigation measures and best management practices.

#### 3.8.2.1 Alternative 1 – No Action - *Implement the 1986 Fire Management Plan*

Factors most likely to adversely impact firefighter health and safety include activities associated with wildland fire suppression efforts (accidental spills, injuries from the use of fire-fighting equipment, smoke inhalation, and, in severe cases, injuries from wildland fires). Impacts to the public could include smoke inhalation, and in severe cases, injuries from wildland fires.

Accidental spills of fire retardants and foams can adversely impact human health & safety. Fire retardants used in controlling or extinguishing fires contain about 85% water, 10% fertilizer, and 5% minor ingredients such as corrosion inhibitors and bactericides. Fire suppressant foams are more than 99% water. The remaining 1% contains surfactants, foaming agents, corrosion inhibitors, and dispersants. These qualified and approved wildland fire chemicals have been tested and meet specific requirements with regard to mammalian toxicity as determined by acute oral and dermal toxicity testing as well as skin and eye irritation tests (USDA, 2001). However, they are strong detergents, and can be extremely drying to skin. All currently approved foam concentrates are irritating to the eyes as well. Application of a topical cream or lotion can alleviate the effects of a retardant, and protective goggles can prevent any injury to the eyes when using foams.

Fuel break construction can pose safety threats to firefighters. Injuries can occur from the use of equipment as well as from traveling overland to targeted areas for firefighting efforts during suppression efforts. While each of the crew is trained in the use of firefighting equipment, accidental injuries may occur from time to time. Strict adherence to guidelines concerning firefighter accreditation, and equipment and procedure safety guidelines would minimize accidents.

Smoke inhalation can also pose a threat to human health & safety. Smoke from wildland fires is composed of hundreds of chemicals in gaseous, liquid, and solid forms. The chief inhalation hazard appears to be carbon monoxide (CO), aldehydes, respirable particulate matter with a median diameter of 2.5 micrometers (PM<sub>2.5</sub>), and total suspended particulate (TSP). Adverse health effects of smoke exposure begin with acute, instantaneous eye and respiratory irritation and shortness of breath, but can develop into headaches, dizziness, and nausea lasting up to several hours. Based on a recent study of firefighter smoke exposure, most smoke exposures were not considered hazardous, but a small percentage routinely exceeded recommended exposure limits for carbon monoxide and respiratory irritants (USDA, 2000b).

Use restrictions applied to areas of wildland fires or prescribed fires would minimize or eliminate public human health & safety concerns resulting from smoke exposure and fire injuries. When

using prescribed fire, mitigation measures, such as construction of fire lines, the presence of engines, and strict adherence to prescribed fire plans, would minimize the potential for an out-of-prescription burn or escape. Elements of the prescribed fire plan that relate to ensuring a safe implementation include such measures as fuel moisture, wind speed, rate of fire spread, and estimated flame lengths. While the potential for a fire escape will always exist when conducting prescribed fires, that potential is extremely small. Recent statistics summarized by the Boise Interagency Fire Center report that approximately 1% of prescribed fires on federal lands required suppression activities of some kind. In most cases these prescribed fires jumped a control line and suppression tactics were successfully used to control them. Out of the 1% of prescribed fires that required suppression, 90% were controlled without incident. Statistically, this result leaves about 0.1% of prescribed fires that required major suppression actions (Stevens, 2000).

Prior to the ignition of any prescribed fire in the park, all the burn parameters of the existing and approved prescribed fire fireplan must be met to ensure a safe and effective prescribed fire. In addition, staff would prepare brochures for the public and for adjacent landowners that advise them of the time and extent of the proposed burn and educate them about the role of fire in the tall-grass prairie. In the event of potentially hazardous fires within the park, the Park Superintendent and Chief of Resources Management would coordinate public notification efforts within and outside the park. The extent of public notice would depend on the specific fire situation. In every case, assuring visitor and park staff safety would take priority over other activities.

#### Conclusion:

The implementation of this alternative would have a minor, short-term adverse impact on human health and safety resources.

#### 3.8.2.2 Alternative 2 - (*Proposed Action*) –*Suppression Of All Wildland Fire; Use Prescribed Fire In All Burnable Habitats*

The general impacts to human health & safety under Alternative 2 would be similar to those under the No Action but more frequent due to the addition of prescribed fires. .

#### Conclusion:

The implementation of this alternative would have a minor, short-term adverse impact on human health and safety resources.

### **3.9 CULTURAL RESOURCES (I.E. HISTORIC STRUCTURES, ARCHEOLOGICAL RESOURCES, AND CULTURAL LANDSCAPES)**

Section 106 of the National Historic Preservation Act requires federal agencies to consider the effects of their proposals on historic properties, and to provide state historic preservation

officers, tribal historic preservation officers, and, as necessary, the Advisory Council on Historic Preservation a reasonable opportunity to review and comment on these actions.

### 3.9.1 *Affected Environment*

Cultural resources at Wilson's Creek include historic structures, artifacts and historic documents and the buildings that house them, and cultural landscapes that are integral to interpretation of the site.

#### Historic structures and resources

Historic resources and the events surrounding them are key park cultural resources, as described in the park's Interim Resource Management Plan. Primary park historic structures include the Ray House and the Ray Spring House:

- The **Ray House** (built 1852 or 1853) is the oldest extant structure in the park and was occupied until 1966. The House and the Ray family were an integral part of the historic engagement which took place at the farmstead on the morning of August 10, 1861. The dwelling served as a field hospital for the Confederates. The body of Union Brigadier General Nathaniel Lyon was brought to the east front room some hours after he was shot on Bloody Hill.
- The **Spring House** existed at the time of the battle and was used to draw fresh water by the Ray family. The Spring House is 150 yards from the John A. Ray House.
- The **General Lyon Marker** is an inscribed granite marker 3'6" in height by 2'1" wide and 1' deep set on a concrete base in 1928 near the spot at Bloody Hill where General Lyon was killed.
- The **Telegraph Road** traverses the battlefield from the east boundary near the John A. Ray House to the western border. It was the principle route from St. Louis to the southwest. Telegraph wire was strung along the road and telegraphic service began the summer of 1860 between Fort Smith, Arkansas, Springfield, Bolivar, and Jefferson City, Missouri. The road was used as a means to transport military equipment and troops throughout the War.
- **Gibson Mill** was a one or two story structure with a massive rock foundation and wood frame construction. The mill was extant at the time of the battle but burned to the ground before the twentieth century. The mill foundation, race traces, and remnants of two dams are the only features that remain. Some portions of the headrace have been obliterated by roads and other forms of development, however, traces of most portions exist.
- The **Short Spring Box** surrounds the spring that drains into Wilson's Creek, located SE of Short House Site.
- Additional structures that may be maintained include headstones in two family cemeteries, sites of an historic house, barn, and outbuildings, the Edward's cabin, and stone walls.

The park visitors center houses the park museum collection, which includes objects such as prehistoric Indian artifacts, munitions, ceramics, glass, nails, uniform garments, paper, photos, edged weapons, firearms, and leather items. One of the largest Civil War research libraries in the NPS (5,000 volumes) is also housed in a new addition to the visitor center.

### Archeological Resources

The approximately 1,750 acres of rolling hills and Ozark uplands which encompass the Wilson's Creek NB contain archeological resources that provide evidence for a continuous 10,000 year use of the area. American Indians occupied the battlefield and surrounding vicinity intermittently from about 10,000 years ago [BP], to the first quarter of the nineteenth century. European-American settlement of the battlefield and general vicinity began during the second quarter of the nineteenth century (NPS, 2004).

Despite the relatively recent establishment of the park, a substantial amount of archeological investigation has been performed within its boundaries. Most of this work has been initiated as a result of development and management decisions or completed in compliance with Section 106 of the National Historic Preservation Act. Because extensive survey and archeological sampling has been performed on a limited number of targeted, mostly historic sites, little is known about the archeological potential of the greater park landscape (NPS, 2004), however, an in press archeological survey of the entire park should fill this information gap.

A recent assessment of Wilson's Creek NB's archeological resources notes that there are fifty recorded archeological sites within park boundaries, about half having historic components and the rest having prehistoric components.<sup>13</sup> Given the existing knowledge of the extensive pre-1960

historic occupation within the battlefield, and the larger knowledge of regional American Indian occupation within the Ozark plateau, it may be assumed that the park contains a substantial number of additional, unidentified archeological sites (NPS, 2004).

### Cultural landscape

At a historic battlefield such as Wilson's Creek, cultural resources and natural resources are intertwined. Cultural landscapes provide the physical environment associated with historical events and reveal aspects of our country's origins and development through their form, features and use. They also illustrate the relationships among cultural and natural resources in a park. The cultural landscape of Wilson's Creek National Battlefield are large rural tracts including both fields and forest, and a varied topography.

Wilson's Creek's Final Master Plan (1977) called for the battlefield's vegetation to be returned to its 1861 condition. Several studies completed in the 1970's and 1980's have shown that at the time of the battle the vegetation, interspersed between five farms, was predominantly oak-savanna. Currently the areas along Wilson's Creek and the larger stream branches support a denser, more typically forest vegetation with considerable underbrush.

In the years following the battle, the land surrounding Wilson's Creek changed. Pastures of exotic grasses were planted to replace the over-grazed, tall-grass prairies and much of the land was divided and plowed into crop fields. Areas that were too steep to farm grew up into dense woods. By the time the National Battlefield was created in 1960, intense agricultural use had so drastically altered the landscape, that the savanna had disappeared. Savannas were either due to land clearing or vegetation encroachment caused by fire suppression.



These changes in the landscape make it difficult to understand battle strategies and troop movements through the area. Management efforts have been directed towards achieving the goal of restoring the landscape to its historic condition, by replanting the oak-savanna vegetation and keeping historic fields open. A 1991 Action Plan outlines long-range goals for re-vegetating the 1,000 acre core of the park to a savanna landscape, and gives detailed prescriptions for the western 330-acre section surrounding Bloody Hill.

The concept of cultural landscapes has evolved since some of the early studies of the historic landscape of Wilson's Creek were completed. A Cultural Landscape Report (CLR) is now required before large scale restoration projects can be undertaken. Therefore, in 1998 park staff requested and secured funding for a Cultural Landscape Report (CLR) and treatment plan. The CLR defines treatments for the cultural landscape and guides management and treatment decisions about the landscape's physical attributes, biotic systems, and use when that use contributes to historical significance. This report was completed in September, 2004, the following recommendations related to fire management have been included.

- Rehabilitate and restore native landscapes within the park to eliminate run-off and enhance infiltration of precipitation into the park's groundwater resources.
- Develop a prescribed fire plan that maximizes the size of prescribed fire units and attempts to burn annually or as frequently as fuel loads and/or park resources permit.<sup>1</sup>
- Develop a vegetation management plan prior to undertaking any changes in the park. Consider carefully the opportunities and constraints associated with prescribed fire, historically-appropriate crop and orchard species, thinning and clearing activities, and other vegetation management issues.
- Employ BMPs for thinning and clearing woodlands. Undertake clearing and thinning operations with the goals of reducing fuel loads, opening viewsheds, and returning the woodland to its approximate composition during 1861.
- Maintain and enhance the health and diversity of vegetation in sensitive or remnant communities particularly the limestone glades and Manley woods shown on *figure 93*.

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<sup>1</sup> Although the contemporary doctrine among most ecologists is that fire is a necessary factor in native plant community health, fire frequencies shorter than 3 years are also considered stressful or detrimental to an array of organisms. It appears that this position is based primarily upon short-term studies that log or record the impacts of burning after 2 or 3 years of fire suppression. Indeed, such an accumulation of fine fuel near the surface of the ground can cause slow moving, cooking fires that can burn at different temperatures and moisture levels. Observed decreases in certain species populations are therefore not surprising. Virtually no long-term studies in remnant systems have recorded fire intervals as frequent as those described by the earliest European-American settlers—fires set annually in autumn. In areas where there has been a long-term use of annual prescribed fire—Walpole Island, Fort Bragg bombing ranges, Eglin Air Force Base in Florida, artillery range at Camp McCoy in Wisconsin—species diversity has clearly benefited. The CLR continues to recommend that as much of the park that can be burned should be burned annually, or as frequently as fuel loads and/or park resources permit.

- Ensure buildings and structures are not damaged by prescribed fire using the following guidelines:
  - Remove leaves and debris from roofs and gutters regularly to decrease the potential for fire hazards.
  - Store firewood and lumber a minimum of thirty feet from structures to decrease fuel near buildings.
  - Prune limbs on trees within thirty feet of a structure up twenty feet above the ground to remove ladder fuels. Likewise, prune limbs encroaching on power lines.
  - Establish a buffer zone of thirty feet, or one hundred feet on slopes, around building clusters. Buffers could include low, mown, grass or vegetable plots.
  - Maintain firebreaks and windbreaks around the perimeter of building clusters to slow or stop fires.
- Clear and/or backfire areas around buildings and structures and other important resources before prescribed fire activities take place.
- Cooperate with neighbors and local law enforcement and fire department officials to address concerns about and explain the park's prescribed fire plan. Keep these parties apprised of specific prescribed fire plans and schedules.
- Maintain the existing firebreak that edges the entire park and ensure that fire does not travel beyond park boundaries.
- Establish an aggressive control plan that incorporates prescribed fire as necessary for invasive species.
- Address smoke management issues: monitor weather conditions, consider impacts, and take precautions when using prescribed fire near populated areas, highways, sensitive habitats, and other smoke-sensitive areas. Postpone prescribed fire activities when regional pollution levels are high or during temperature inversions.
- Plan prescribed fire activities for times of year when wildlife are not nesting. Consider and provide escape routes for wildlife in the prescribed fire area. For example, do not use the "ring burn" format, where fires are lit from the edges of a patch and burn to the center, as it can trap wildlife. This also creates a hotter flame than desirable in the center of the patch when the fires meet, which can cause damage to resources.
- Take into consideration the potential effects on archeological resources when developing a plan for using prescribed fire.

- Protect small-scale features and other fire-sensitive resources within prescribed fire zones.

Consider alternatives in the design of interpretive materials, such as waysides, that can survive prescribed fire, be removed during prescribed fire use, or be otherwise protected from unwanted burning.

### 3.9.2 *Environmental Consequences*

Cultural resource impacts were qualitatively assessed through a presence/absence determination of significant cultural resources and mitigation measures to be employed during prescribed fire activities.

#### 3.9.2.1 Alternative 1 – No Action - *Implement the 1986 Fire Management Plan*

Conclusion:

The no action alternative will have a negligible effect on historic structures and archeological resources, however, it will have a moderate, long-term adverse impact on the cultural landscape. This impact is due to absence of prescribed fire which is one of the primary recommendations of the cultural landscape report.

#### 3.9.2.2 Alternative 2 - (Proposed Action) –*Suppression Of All Wildland Fire; Use Prescribed Fire In All Burnable Habitats*

Proposed activities with the potential to impact cultural resources include clearing fire lines and prescribed fires. Prescribed fire is an integral part of maintaining and enhancing the cultural landscape at the park. Field work has recently been conducted at Wilson's Creek which provided information on the effects of prescribed fires on artifacts on the surface and up to 3 centimeters below the surface. Preliminary conclusions suggests that fire effects on stone artifacts are usually negligible, although occasionally discoloration or breakage may occur (Kaye, pers. comm., 2002, buenger 2004). At the same time, historic structures and collections are vulnerable to fire and must be protected.

Prescribed fire may be used in conjunction with other hazard fuels reduction techniques such as mowing and raking to reduce buildup of fuels near historic sites. Prescribed fire will also be an important part of helping to re-establish vistas important to visitor understanding of the historic scene existing at the time of the battle.

Precautions will be taken during fire suppression and prescribed fire activities not to destroy or disturb archeological and historical resources in the park. The Chief of Resources Management will be informed of all fire management activities. Wherever feasible without compromising public and firefighter safety, known cultural resources will be avoided during fire suppression. Prescribed burns and mechanical thinning may be used to reduce hazard fuels near historic structures.

#### Conclusion:

The proposed action will have a negligible impact on historic structures; a minor, long-term adverse impact on archeological resources; and a positive impact on cultural landscapes.

### 3.10 CUMULATIVE EFFECTS

The cumulative effects analysis for the Fire Management Plan environmental assessment considers the past, present, and reasonably foreseeable future actions on land uses that could add to (intensify) or offset (compensate for) the effects on the resources and that may be affected by the fire Management Plan alternatives. Cumulative effects vary by resource and the geographic areas considered here are generally the park and areas adjacent to the park. In some instances, activities may result in both negative and positive impacts when considering the short and long-terms. As a result, some resource categories in Table 3-1 show both positive and negative impacts resulting from a particular activity. The information provided in Table 3-1 is the basis for the cumulative effects described in Table 3-2.

**Table 3-1 Cumulative effects**

<b>Resource</b>	<b>Past and Present Actions</b>	<b>Proposed Actions</b>	<b>Future Actions</b>	<b>Cumulative Effects</b>
<b>Geology &amp; Soils</b>	Adverse soil impacts (soil erosion or loss) from past timber practices, road building, agriculture, and mineral extraction in surrounding areas, past wildland fires and suppression efforts; beneficial soil impacts from past wildland fires (increased soil nutrients )	Prescribed fire, thinning and wildfire suppression activities would have temporary and minor adverse effects on soils (soil erosion), but beneficial effects as well over the short and long-terms (soil development and increased soil nutrients)	Adverse soil impacts (soil erosion or loss) would continue from timber practices, road building, agriculture mineral extraction and residential development in surrounding areas, past wildland fires and suppression efforts; beneficial soil impacts from past wildland fires (increase soil nutrients)	Soils inside of park would improve over time due to development and prescribed fire. Plan would not have cumulative impacts.
<b>Water Resources</b>	Water quality of Wilson's Creek has been altered by upstream human activities, past and present, within the watershed. Adverse impacts are the result of runoff from Springfield's wastewater treatment plant, agricultural runoff, storm water runoff, and leakage from septic systems in nearby communities.	Prescribed fire and wildland fire suppression activities would have minor impacts on surface waters. Avoidance of use of foam chemicals near water sources during firefighting would minimize potential for pollution. Avoiding firelines near the Creek would reduce chances for additional runoff.	Rapid growth of nearby communities is expected to continue affecting water quality of Wilson's Creek. Impacts include leakage from overtaxed septic systems, wastewater runoff from sewage treatment facilities, storm water runoff, agricultural runoff.	Minor effects on water quality. Fire Management Plan would not result in significant cumulative impacts.
<b>Wildlife</b>	Past suppression of natural fire regimes in the park, along with rapid development of adjacent private lands, have led to some diminishment of wildlife habitat and diversity	Prescribed fire and mechanical thinning would result in minor, short-term disturbance and displacement with minimal loss of wildlife; improved habitat and increased wildlife diversity with prescribed fire in various habitats	Pressure on wildlife habitat off the park will likely continue, making park lands a potential refuge for some species.	Wildlife habitat increases; Fire Management Plan does not result in significant cumulative impacts.
<b>Threatened and Endangered Species</b>	Human intrusion into caves, and wildlife habitat destruction have reduced bat populations nationwide. Suppression of natural fire regimes has limited habitat for both the Missouri Bladderpod and Royal Catchfly.	Avoiding prescribed fire activities in the vicinity of caves where bats hibernate and/or bear young would be required under all alternatives. Returning to a more natural fire regime should benefit habitat for endangered plant species.	Pressure on wildlife habitat off the park will likely continue, making park lands a potential refuge for endangered species. Ecosystem-level management practices in the park will enhance habitat for T&E species.	With proper management, Fire Management Plan would not result in significant impacts to the proposed action. Missouri Bladderpod and Royal Catchfly.
<b>Air Quality</b>	Air quality in the area is generally good; the park and surrounding areas are in attainment for all National Ambient Air Quality Standards. Current prescribed fire activities do not significantly impact air quality. Growth of residential areas near park boundaries requires attention to smoke issues.	Prescribed fire emissions would result in minor, short-term and localized air quality and visibility impacts.	Future wildland fires could contribute to temporary deterioration in air quality and visibility.	Class II air quality would not be violated. Plan would not have cumulative impacts.

Table 3-1 Cumulative effects				
Resource	Past and Present Actions	Proposed Actions	Future Actions	Cumulative Effects
<b>Visitor Use and Experience (including Park Operations)</b>	The Park has an opportunity to present visitors with education on the role of fire in ecosystems and how lack of fire has impacted the historic scene. Peak visitation days (in particular the date of the historic battle) are avoided for prescribed burns. Minor visitor use and experience impacts resulting from prescribed fire.	Minor visitor use and experience impacts resulting from prescribed fire.	Minor visitor use and experience impacts resulting from prescribed fire.	Long-term effects on landscape through prescribed fire for recreation and treatments and Management in significant
<b>Human Health &amp; Safety</b>	Past suppression efforts protected park staff and visitors. Present prescribed fire	Prescribed fire use might result in very minor impacts; long-term improvement in human health & safety with reduction in fuels	Similar effects as described in Past and Present Actions	Human health improve over fire and thinning Management in significant there would be impacts under
<b>Cultural Resources</b>	Establishment of the park helped protect cultural resources. Past suppression efforts have negatively impacted cultural landscape, while use of prescribed fire has made some positive impact on cultural landscape.	Use of prescribed fire in burnable habitats would improve cultural landscape & reduce fuels near historic sites.	Use of prescribed fire in burnable habitats would improve cultural landscape & reduce fuels near historic sites.	Fire Management result in significant impacts; fuels reduce danger wildland fire.

**Table 1-2: Impact Thresholds: Definitions of Intensity, Duration and Extent for Each Impact Topic**

Impact Topic	Intensity				Duration	Extent
	Negligible	Minor	Moderate	Major		
Geology and Soils (Including Prime and Unique Farmland)	Soils and geologic resources would not be affected or would be below levels of detection.	The effects to soils and geologic resources would be detectable. Effects to soil fertility or natural physical features would be of little consequence.	The effect on soils and geologic resources would be readily apparent. Changes to natural physical resources would be measurable and of consequence.	The effect on soils and geologic resources would be readily apparent, and substantially change the character of the soils over a large area in and out of the park. Changes to natural physical resources would be measurable and severely adverse.	Short-term – Recovery would take less than 3 years Long-term – Recovery would take more than 3 years.	Localized – Impacts would occur in small areas within the treatment area Local – Impacts would occur over large areas of the park Regional – Impacts would extend beyond park boundaries
Water Resources (Including Floodplains)	Water resources, would not be affected or changes would be below levels of detection.	The effects to water resources would be detectable. Effects to water quality, aquatic life, or floodplain morphology would be of little consequence.	The effect on water resources would be readily apparent. Changes to water quality, abundance of aquatic life, or floodplain morphology would be measurable and of consequence.	The effect on water resources would be readily apparent, and substantially change water quality, the abundance of aquatic life, or floodplain morphology over a large area in and out of the park. Changes to water quality, aquatic life abundance, and floodplain morphology would be measurable and severely adverse.	Short-term – Recover would take less than 3 years. Long-term – Recovery would take more than 3 years.	Localized – Impacts would occur in small areas within the treatment area Local – Impacts would occur over large areas of the park Regional – Impacts would extend beyond park boundaries
Vegetation	There would be no observable or measurable impacts to vegetation.	Mortality of individual trees/shrubs may occur, but the population would not be expected to be outside the natural range of variability. Slight improvement of habitat may occur.	There would be substantial mortality of trees/shrubs that would cause populations to be outside their natural range of variability. Substantial improvement of habitat may occur.	There would be extensive mortality, causing the extirpation of species.	Short term – Recovery of species would occur within 1 year Long term – Recovery of species would occur more than a year	Local – Impacts would occur within park boundaries Regional – Impacts would extend beyond park boundaries -

Impact Topic	Intensity				Duration	Extent
	Negligible	Minor	Moderate	Major		
Wildlife	There would be no observable or measurable impacts to wildlife or species or habitat.	Mortality of individuals may occur, but would not be expected to be outside the natural range of variability. Slight improvement of habitat may occur.	There would be substantial mortality of individuals that would cause populations to be outside their natural range of variability. Substantial improvement of habitat may occur,	There would be extensive mortality, causing the extirpation of species.	Short term – Recovery of species would occur within 1 year Long term – Recovery of species would occur more than a year	Local – Impacts would occur within park boundaries Regional – Impacts would extend beyond park boundaries -
Threatened and Endangered Species	There would be no observable or measurable impacts to rare or listed species.	Occasional flight responses by animals are expected, but without interference with feeding, or reproduction.	There would be mortality of a couple individuals of rare or listed species, but within the range of their natural variability.	There would be mortality of many individuals, interference with their breeding, feeding, or changes in habitat that would influence their survival	Short term – Population would recover within one year. Long term – Population would recover in more than one year.	Local – Impacts would occur within the park. Regional – Impacts would occur outside the park.
Air Quality,	No changes would occur or changes in air quality would be below the level of detection.	Changes in air quality would be measurable, but would have little impact on staff, visitors or neighbors.	Changes in air quality would be measurable, would have consequences, impacting staff, visitors and neighbors.	Changes in air quality would be in violation of Class II airshed standards.	Temporary – Recovery would take less than in one day. Short-Term – Recovery would take less than one week. Long-term – Recovery would take more than one week.	Localized – Impacts would occur within park boundaries Local – Impacts would extend within 5 miles of park boundaries Regional – Impacts would extend beyond 5 miles park boundaries.
Visitor Use and Experience (Including Park Operations)	The visitor would not likely be aware of the effects associated with the alternative.	The visitor would be aware of the effects, but the effects would be slight.	Visitor would be aware of the effects, and would likely be able to express an opinion about the changes.	The visitor would be aware of the effects, and would likely express a strong opinion about the changes.	Short term – Changes would last less than 1 month. Long term – Changes would last more than one month.	Localized – Impacts would affect areas of the park. Widespread – Impacts would affect the entire park.



Impact Topic	Intensity				Duration	Extent
	Negligible	Minor	Moderate	Major		
Human Health and Safety	The health and safety of visitors and employees would not likely be affected. Multiple reports of close calls or minor injuries not requiring medical attention would occur each year.	The effect on health and safety of the visitor and employees would be slight. Multiple non-life threatening accidents requiring medical attention would occur each year.	The effect on health and safety of the visitor and employees would be moderate. Multiple life threatening accidents would occur each year that would require serious medical attention.	The effect on health and safety of the visitor and employees would be major. Fatalities would occur.	Short term – Changes would last less than 1 month. Long term – Changes would last more than one month.	Localized – Impacts would affect areas of the park. Widespread – Impacts would affect the entire park.
Cultural Resources i.e. (Historic Structures, Archeological, Cultural Landscapes)	Impacts are below levels of detection.	Disturbance of a historic structure, archeological site, or alteration of a pattern or feature of a cultural landscape results in little, if any loss of integrity. Artifacts would be discolored or have surficial damage.	Disturbance of a historic structure, archeological site, or alteration of a pattern or feature of a cultural landscape results in a loss of integrity. Artifacts would be cracked, crazed or have other structural damage.	Disturbance of a historic structure, archeological site, or alteration of a pattern or feature of a cultural landscape results in loss of integrity. Artifacts would be lost, crushed, or removed completely from their historic context.	Temporary – Impacts would not be permanent. Permanent – Impacts would be permanent.	Localized- Impacts would impact one or two historic structures, archeological sites, or cultural landscapes. Widespread – Impacts would impact more than 2 historic structures, archeological sites, or cultural landscapes.

## **Consultation and Coordination**

### **List of Preparers**

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### **Persons, Organizations, and Agencies Consulted**

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Richard P. Lusardi, previous Superintendent, Wilson's Creek National Battlefield  
Rob Klein, previous Fire Ecologist, Ozark National Scenic Riverways  
Robert Randall, Wilson's Creek National Battlefield  
Amy Salveter, U.S. Fish and Wildlife Service  
Angela Smith, Ozark National Scenic Riverways  
Gary Sullivan, Wilson's Creek National Battlefield  
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Lisa Thomas, previous LTEM Coordinator, Wilson's Creek National Battlefield  
Paul Vitzthum, Southwest Regional Office, Missouri Department of Natural Resources

## **PUBLIC INVOLVEMENT AND CONSULTATION**

Internal NPS and public scoping were conducted to obtain input on the project. Involved agencies and the public were invited to comment on the environmental assessment.

The environmental assessment was made available to the public via a press release mailed to over 100 local newspapers, TV and radio stations, local agencies, and interested members of the public. The public comment period was closed on December 22, 2004.

Several American Indian tribes have demonstrated interest in the areas within Wilson's Creek National Battlefield. A summary of the environmental assessment were sent to the Osage, Delaware, and Cherokee Nations. The Osage Nation responded by letter on December 15, 2004. The tribe determined that the site could have religious or cultural significance to the Osage Tribe and if construction activities should expose Osage archeological materials, such as bone, pottery, chipped stone, etc, we ask that construction activities cease, and there office be contacted so that an evaluation can be made. The Delaware Nation responded by letter on December 14<sup>th</sup>, 2004. The Delaware Nation is particularly concerned with archeological sites that may contain human burial remains and associated funerary objects. They agreed that the the action does not appear to endanger archeological sites but deferred to the state archeologist and SHPO regarding the need for archaeological surveys or further investigation. Should archeological surveys be required the tribe would like copies of the surveys, site forms and reports.

The Missouri State Historic Preservation Officer (SHPO) received a copy of the FMP sent by Federal Express on November 27, 2004. The letter accompanying this copy requested consultation. Follow up phone calls were made on November 22<sup>nd</sup> and a second copy was sent

and arrived via Federal Express on December 27<sup>th</sup>. As of December 28, 2004 the SHPO has made no comment on the environmental assessment during the 30-day review period.

The U.S. Fish and Wildlife Service was consulted informally regarding this project, and agreed with the preserve's finding of no effect on threatened and endangered species. A copy of the environmental assessment was sent to the Service on November 24, 2004. The FWS concurred with the finding of no affect in a response letter dated December 22, 2004.

The following federal agencies, state agencies received copies of the environmental assessment for review and comment. Tribes received a summary of the action.

**Federal Agencies and Government**

U.S. Fish and Wildlife Service, Columbia, MO

**State and Local Agencies and Governments**

Missouri State Historic Preservation Office

American Indian Tribes

Cherokee Nation, Anadarko, Oklahoma

Delaware Nation, Anadarko, Oklahoma

Osage Tribe, Pawhuska, Oklahoma

Wilson's Creek National Battlefield  
Foundation

## Persons, Organizations, and Agencies Who Received This Environmental Assessment

U.S. Fish and Wildlife Service  
Missouri State Historic Preservation Officer

### Scoping

Details of the scoping process and the issues that arose from it are described in Chapter 1, Section 1.5 – *Scoping Issues and Impact Topics*.

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